NATURE MAGAZINE

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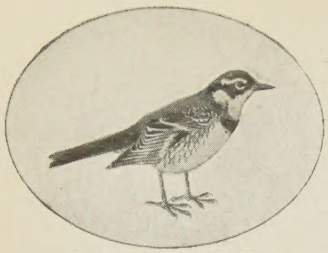

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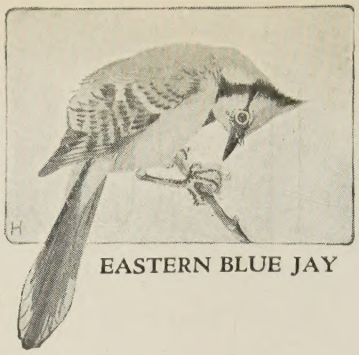

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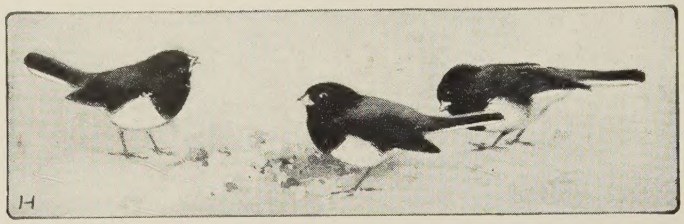

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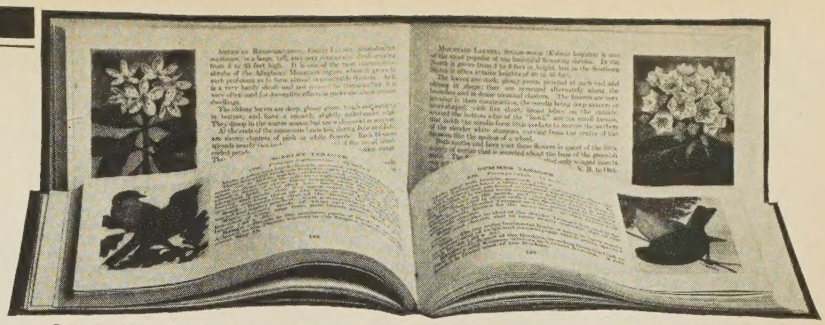

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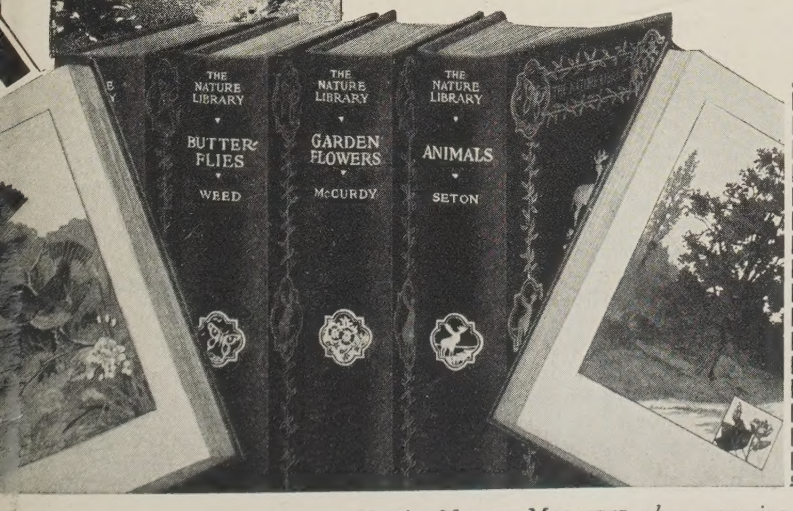

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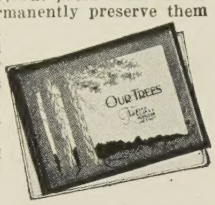

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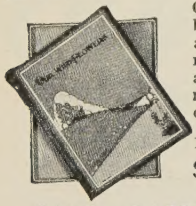

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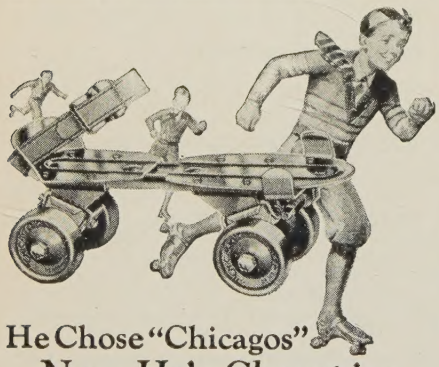

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NATURE IN PRINT

On Bird Migration

The Migration of Birds by Alexander Wetmore (Harvard University Press, Cambridge, Massachusetts, $2.50) has reached its third edition, a tribute to its worth and to the popularity of the creatures whose seasonal movements it describes. We note that the present edition has an index, a feature that greatly increases its usefulness.

From earliest times men have noticed that many birds disappeared in autumn and came back in the spring (in the northern hemisphere) and have pondered over their manner of journeying. To the ancients the passage of the strong-winged larger species over extensive bodies of water was easily understood, but they could not believe that the smaller species were able to perform such feats. Therefore, the timely appearance of such birds as the swallow, soon after the close of winter, was laid to its having passed that season hibernating in the bottom of ponds and streams. Sworn testimony in support of this theory was recorded, and drawings representing the lethargic birds may be found in old prints. Nor was this the only explanation invented to account for far journeys made along invisible pathways, that in later years have been fully explained by careful observations backed by the positive identification of individuals by banding.

The theories that serious students of bird migration have evolved to account for the origin of migration are discussed. It seems most likely that seasonal movements of broad scope had their beginnings in geological changes, and especially in the several glacial movements that so signally influenced the dispersal of life in various parts of the globe.

The book embodies a series of lectures that were delivered before the Lowell Institute in Boston in the autumn of 1925. The author, assistant secretary of the Smithsonian Institution, is well known as among America's foremost students of ornithology, both in the field and the laboratory. His report on migration forms an excellent treatise on this important and fascinating subject.

Louisiana Trees

Louisiana, through its Division of Forestry, has recently issued a valuable monograph, *Forest Trees of Louisiana, and How to Know Them,* prepared by Caroline Dormon. Though scientifically accurate, it is popular in treatment and designed for the amateur tree-lover. Behind its issuance is the belief that only by knowledge of the value of trees will the dwindling forest reservoirs be saved. The foreword says, "The hope for the future of Louisiana's forests and forest industries lies in a proper appreciation of the trees that make up these forests. That the people of Louisiana and the visitors to our state may know and rightly value our trees, this book is prepared in the confident belief that having this knowledge they will protect and foster trees and tree growths." The pamphlet is available on application to the Division of Forestry, at New Orleans.

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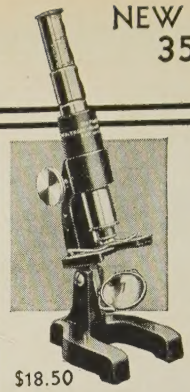

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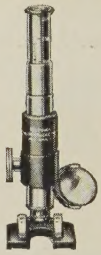

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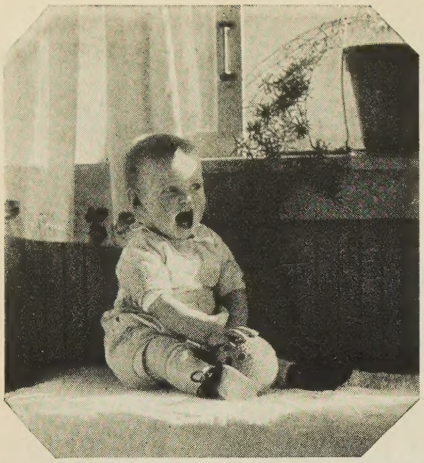

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THERE'S one thing children just can't help doing—and that is *Growing Up!* Growing up is even more certain than mumps or measles—but there the comparison ends. When the mumps and measles are over, children are still children—but when the Growing Up ends, the children are young men and women. Gone are the little mannerisms, the baby smiles—all the hundred and one actions that mean so much to parents. Gone? In one sense, yes—but by planning now you may capture childhood for the years to come, not only by keeping a consecutive snapshot record, but on a *movie* screen in your own home. The amateur movie camera will get and keep it for you forever!

It is now as simple a matter to make a movie record of your child as it is to make snapshots. If you start early enough, you'll see your child as an infant in arms; later you'll see him take his first steps, have his first tumbles and then you'll realize that he has emerged from babyhood and has become a little boy or girl.

Not long after, will come prep school days—a period offering a harvest of interesting movies and snapshots. The boy in action on one of his school teams, the girl in her out-of-door good times—these are things that vividly emphasize the all-too-swift passage of time between babyhood and youth.

And most wonderful of all is that such pictures can now be made in actual colors as well as with the ordinary black and white rendering to add much to the record.

Under-Exposed

ACTION of light is what records the latent image on the film. Not much, however, could be expected from a snapshot by moonlight. If the sun that shines on the subject is weak, the image will be weak and the final print indistinct unless the exposure was long enough.

Photographic DEPARTMENT

EDITED BY ROBERT T. LOWELL

The Cat's Eye And the Eye of Your Camera

WHAT schoolboy hasn't hauled old Tabby into the dark for the fun of watching her glowing eyes perform. As the room is dimmed, the irises open, to collect extra light for clearer vision. That's Nature's way of adjusting the sight system, and right here is an analogy.

The eye of the camera is the lens and it, too, has an iris: the "stop" or diaphragm device which controls the amount of light let in when you "click" the shutter. On a dark day, under trees or when the sun is low, this iris must be opened wide to admit sufficient light for proper exposure.

The manual with your camera explains thoroughly about its use. To know just how it operates is a big help toward getting good pictures no matter what the lighting conditions are.

If you would know more about your camera lens, write the editor of this department for a special booklet, and for an exposure guide leaflet if you have not already received one from another source.

Newsy Notes Literature on Request

The Kolibri camera of the Zeiss Ikon Series gives 16 pictures 1¼" x 1⅝" on the regular Vest Pocket camera film. The Kolibri is equipped with an ultra-fast (f.3.5.) sharp cutting lens said to produce negatives from which enlargements of contact print quality can be made. The camera fits the pocket and is ideal for the traveler. Carl Zeiss, Inc., 485 Fifth Avenue, New York City.

Talking pictures for the home! Among several equipments available is the Pathé which, just recently announced, has created much comment. Standard theatre disc records supply the sound for the Pathé 9.5 mm. Talking Motion Pictures. Projector and sound mechanism are housed in a fine period cabinet and the price is said to be remarkably low. Pathé Films, Inc., 35 West 45th Street, New York City.

A new exposure meter for the amateur motion picture enthusiast claims accuracy with decided simplicity. It is a little disc, a pocket affair, and its mission is to prevent film wastage. A 5-day free trial period is offered to convince. Herbert & Huesgen, 18 East 42nd Street, New York City.

The clever and petite Memo Camera, a product of Agfa Ansco of Binghamton, N. Y., continues to enjoy much popularity. This Ansco camera gives fifty exposures on one fifty cent film. There is a direct vision spyglass type of finder and no lens focusing is required. In addition to the intimate little prints and good sized enlargements possible, the pictures may be projected onto a screen with the Ansco Memoscope. A modern magic lantern!

Bell & Howell Co., makers of the sturdy and efficient Filmo amateur movie camera, also recently announced a sound movie outfit. The Filmophone is easily portable contained as it is in two "suitcases".

DOG TEAM RACES LAKE PLACID

Rapidly Moving Objects

WHILE it is unquestionably an advantage to have a camera equipped with a fast lens and rapid shutter, pictures of fast-moving objects can be made successfully with the inexpensive and simple little box cameras. It is all in knowing how.

Assuming that light conditions are satisfactory for the camera at hand, the fast-moving object can usually be "caught" if one stands so that the subject travels toward or away from the camera and at approximately an angle of 45 degrees. The risk of movement showing in the negative is also lessened as the distance between the camera and the moving object is increased.

For example, if our subject is moving at *right* angles to the camera at a speed of, say, ten miles an hour, it would be best to take the picture at a distance of seventy-five feet or more. If it is moving *diagonally* across the field of view, it might be safely photographed at a distance of fifty feet. While if it is moving directly *toward* or *away* from the camera, it can be snapped at a position about forty feet away.

From this you will gather that sharp pictures of rapidly moving *nearby* objects can only be secured with very short exposures and it is here that the camera with the rapid lens and rapid shutter proves its worth.

The rule that many adopt when using a compact hand camera for picturing fairly nearby moving objects is to use the largest stop and give the shortest exposure that the camera can make. The subject should, of course, be in bright sunlight if the lens has a speed rating *slower* than *f*.6.3.

The most pleasing pictures of moving objects are usually obtained when the subject is moving toward the camera but *diagonally* at an angle of around 45 degrees.

Do You Know That—

SLIGHT over-exposure is always preferable to under-exposure?

Most so-called "moonlight pictures" are made in the daytime, and that a snapshot exposure when the sun is near the horizon will produce such a picture?

A color filter will record the clouds?

Poland Conservation

Eric P. Kelly, the author of *The Trumpeter of Krakow,* which was selected as one of the outstanding novels of recent years, has recently brought out *The Blacksmith of Vilno,* a tale dealing with Polish life of the eighteenth century. The background of this pleasing novel is the old forest of Bialowieza in Lithuanian Poland, where once lived the zubra, a European bison the hunting of which, in times past, was the sport of kings. The zubra was driven back little by little by civilization until only where governments aided its preservation did it exist. Poland had managed to preserve several hundred of these specimens up to the time of the Russian Revolution, but the Bolshevik armies killed and ate the remaining animals, claiming that they were bourgeois because, having passed from the wild state to practical captivity upon a government reservation, they merely constituted extra mouths to feed.

Professor Kelly, returning from Poland shortly after the publication of *The Blacksmith of Vilno,* has suggested that a few American buffalo, first cousins to the zubra, might be transplanted to the forest, which is now government-controlled, and thus not only perpetuate the old traditions of the region but make another link between friendly nations.

Professor Kelly's book does not directly deal with Nature, but because of its literary worth and interesting setting will interest many readers of Nature Magazine. It is published by Macmillan at $2.50.

Persecuted

"'. . . Among the worst sufferers from man's wanton persecution and cruelty are the members of the three classes of vertebrates—reptiles, amphibians and fishes, especially the reptiles and amphibians. Harmless and even useful as most of them are, they are made to suffer cruelly because of foolish prejudice, dread and superstition. . . . What if our outdoors were no longer to know the cheering choruses of frogs, the skiftly darting forms of lizards, or the droll lumbering figures of the turtles? Would the destruction of these creatures really make nature round us more attractive?" So writes C. W. G. Eifrig, Instructor in Nature Study, River Forest, Illinois, in the preface of his book, *Reptiles, Amphibians and Fishes,* and then proceeds to make so captivating and intriguing the life of creatures of these classes that few would have the heart to hurt them. Replete with pictures, accurate in fact and simply written, the work will serve nicely as a text or as collateral reading in a Nature course. It is published by Rand McNally & Co., Chicago, and is low-priced at $1.28.

Wisconsin Movies

The Wisconsin Conservation Commission has prepared thirteen reels of wild life motion pictures for distribution to Wisconsin sites. Some of the titles are: *Wisconsin Prairie Chicken, The Sand Hill Crane, The Heron, Wild Life in the Land of Lakes* and *Winter Logging in Northern Wisconsin.* The films are of standard width and fully titled, and may be obtained from the Commission at Madison or the University Bureau of Visual Instruction at the same city.

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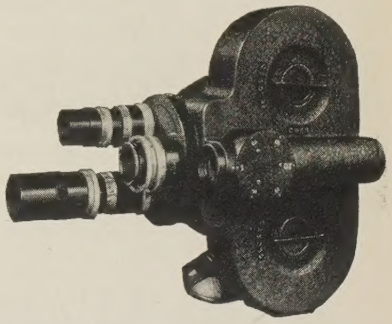

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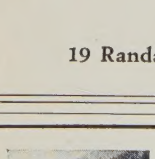

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Physics Text Book

A new issue of Carleton John Lynde's *Everyday Physics,* a practical textbook much in use in the public schools since its first issue in 1914 (and which this writer once studied), has come from the Macmillan Press. It is practically the same work, with a few new chapters, notably on talking and colored moving pictures, television, and radio; and the same method—that of discussing household appliances familiar to the student as examples before leading him into the more complicated realms of a problem—has been followed throughout. Dr. Lynde, Professor of Physics at Teachers College, Columbia University, is lucid and logical in his presentation of the introductory material contained in his book. The price is $1.80.

Plea for the Antelope

From the office of the Emergency Conservation Committee comes an interesting pamphlet, "The Antelope's S. O. S." It reviews the past and present conditions that surround this unique animal, now desperately in need of protection, and urges the establishment of a preserve covering parts of seven counties in Oregon, Idaho and Nevada, where these states corner with each other. The conditions recommended as governing such a preserve provide for no interference with present economic uses of the area involved, excepting that domestic sheep be barred from it. Reasons for insisting on this provision are given at length and are convincing. The preserve would also benefit the sage grouse, also in great danger.

The pamphlet quotes from a paper by M. S. Garretson, secretary of the American Bison Society, published in the annual report of the Society for 1922-1923, and from a more extended and hitherto unpublished article by the same author, both relating to the region under discussion and in support of the general project. These relate to conditions existing several years ago, and it is common knowledge that the lot of the persecuted antelope has not been bettered since that period. The present circular seems to us to constitute a good summary of the needs of the antelope, and the proposed preserve, or a similar one in that region, deserves the support of all its friends.

It is announced that copies of the circulars may be obtained, as long as available, by addressing Davis Quinn, Secretary, 3548 Tryon Ave., New York City.

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Game Fishing

The lure of the sea combines irresistibly on the Pacific coast with the lure of tuna and swordfish and lesser fry of the deep. Game fishing has made famous, through its popularity, both the town of Avalon on Catalina Island and the Tuna Club. Some of the thrills of this sport are recounted by George C. Thomas, Jr., and George C. Thomas, III, in *Game Fish of the Pacific*. Both authors are avid fishermen. Both hold world records for catches. Both possess the highest honors of the Tuna Club. And—which is not always true of sportsmen—the combination writes spiritedly and interestingly. They describe some of their adventures with monsters of the deep—particularly those on a recent Mexican trip on which they caught forty-four varieties of game fish. Likewise, they give the inland fisherman, happy with his trout, bass and pike, a little worry—is his sport the most exciting, after all? The attractiveness of the volume is enhanced by numerous illustrations taken by the authors. It is published by J. P. Lippincott Company at $5.

Garden Pools

A waterless garden always causes esthetic thirst, and even a pool of tub size will add immeasurably to a home lot, especially if a few water lilies or a tropical fish or two enliven the surroundings. The many who have wanted pools but did not know exactly how to go about getting them will relish *Garden Pools,* by L. W. Ramsey and Charles H. Lawrence. This volume is a factual little book replete with information on pool construction, the growing of aquatic plants, proper landscaping, and the care of interesting water pets. The authors are well-known landscape artists, and their suggestions are both practical and in good taste. Macmillan adds this book to its already large horticultural library. It is priced at $2.50.

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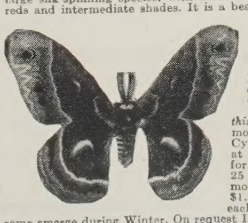

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ROADSIDE BEAUTY

An Editorial

THERE was recently held in Washington a conference on Roadside Business and Rural Beauty. It was called by the organized outdoor advertising industry and the associated real estate business. It was attended by a variety of interests concerned with our rural roadsides from the commercial point of view; by a lesser representation of the public interest, including the American Nature Association. Other public-minded groups chose to decline on the understandable grounds that many similar conferences in the past have been sterile of results however fecund they may have been of promises from the industry.

There was about this latest gathering, however, something not hitherto much in evidence. It was a spark of willingness on the part of the industry to recognize the growing strength of public objection to billboard-strewn rural roadsides. This spark was blown into faint flame by the able conciliation of the chairman, the Hon. George Wharton Pepper. Whether it will become eternal light as a result of the continuation of this conference is subject to doubt. The breach between the public view and the industry's view is a wide one.

Again, at the conference, there arose the industry's statement that only five per cent of the organized billboards are in rural locations. Linked with this was the assertion that only between five and six per cent of this five per cent are "organized" signs. These claims naturally bring the query as to why, if the rural boards are such a minor proportion, should not the industry cooperate in improving the condition of our rural landscape. The answer probably lies in the strange custom of the billboard industry to count as a single "structure" any number of boards joined together by lattice work. Also they include all signs on buildings. Indeed, several counts made by the surveys of the public interest groups reveal "organized" boards, actually defacing the landscape, to constitute between twenty-five and fifty per cent of the total number and often as high as eighty-five per cent of the area.

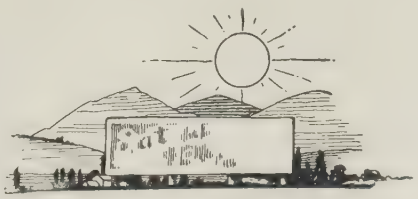
There was also, at the conference, an underlying feeling of lack of confidence in the sincerity of the industry. This former Senator Pepper labored diplomatically to dissipate. This is a difficult thing to achieve, both on past performances and present activities. It is difficult, for example, for representatives of the public to feel confidence in expressions of sincerity, when across the Potomac billboards have been going up on a stretch of rural, wooded highway so that they would be untouchable in the event Fairfax County, Virginia, enacts a zoning law authorized by the State Legislature. It is likewise hard to avert suspicion in the light of the early complacence of the industry when faced with the results of a survey of the uglified approaches to the National Capital. This attitude was later modified, but not to any serious degree.

It may be asserted that these words will be challenged as representing an uncompromising viewpoint—a disposition to set at naught in advance any possible achievements of the conference. This is not the case. We hope that something can be accomplished to improve the situation. Nevertheless, we cannot afford to allow this meeting—as yet only a gesture—to veil the real and immediate need for improvement.

After all, the conference has thus far produced only an embryonic and theoretical suggestion for rural zoning. It has brought from the industry a guarded and unofficial agreement that there might be a highway on which billboards might be banned and a filling station or food stand admitted. At the same time it has given the industry an argumentative weapon to use against pending legislation and for the repeal of existing legislation. It can plausibly be urged—and doubtless will be—that other restrictions should be allowed to await the results of this conference.

In the meantime, however, the industry will not stop erecting rural billboards. Likewise, those seeking return of rural roadside beauty should not slacken their activity. The American people have spent too much money building up a highway system to sit back and let it be completely ruined.

And there is one thing the conference did demonstrate and that is that public opinion is taking effect. The American people have infinite capacity for indignation.



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I PREFER MY DOGS

BY LUCY SALAMANCA

Illustrated with reproductions from original etchings loaned specially by and with the compliments of Diana Thorne, noted etcher of dogs

"JE PRÉFÈRE *mes chiens, je connais trop les hommes,*" said a famous Frenchman.

When I was a little child I read, like every other little child, I suppose, that morbid tale of Charles Dickens—*Oliver Twist.* One vivid and terrible impression remains with me through the years. It is the picture of Bill Sykes' dog hurtling himself after the falling body of his brutal master, from the roof's parapet. Whipped, starved, abused, he trotted through the pages of that book the epitomization, to me, of loyal and unreasoning devotion. In a life that has never, until the moment, been dogless, I have known merrier comradeship than this. Sykes' dog, nevertheless, I shall never forget.

It is astonishing that of all the animal kingdom, outside of man, no animal should love man but the dog. It is astonishing that such a trivial bundle of flesh and fur should embody our most noteworthy Christian virtues—devotion, humility, forgiveness, service, unselfishness. I have no patience with the overly-sentimental

THE INNOCENT

A SUB-DEB OF BOSTON

attitude toward the dog. On the other hand I believe that heart lacks something very rich indeed which does not warmly recognize the qualities of the one creature whose whole happiness consists in being near man. The dog is the only living thing upon whose unswerving fidelity we can pin our faith. "Slings and arrows of outrageous fortune" in no wise influence that fidelity. He shares our poverty with as good a grace as he shares our palmiest days. Visitations of ill health or sorrow serve to increase his deliberate guardianship. Just when this comradely relationship began it is almost impossible to ascertain. Certainly it has existed for a long while and dates back to the days of the cavemen.

We know definitely that the dog has been man's companion for many centuries. History bears out the fact with fascinating incidents, hieroglyphics, delineations, sculpture and anecdotes. Ancient proverbs and old superstitions have come down to us, having to do with the dog. Walls of ancient tombs bear his likeness, and works written before the birth of Christ make mention of him. In certain parts of Egypt he was held in profound respect, notably in the city of Cynopolis, where members of the household were plunged into mourning at the death

POLICE PATROL

of a dog, shaving their heads and rejecting food, beating themselves and uttering lamentations.

From China have come many fantastic proverbs and more fantastic superstitions regarding the dog. In the legend and tradition of every country his figure appears. Until very recently the people of North Borneo believed that a fiery dog watched at the Gates of Paradise. In the Pomotus the first race of man was said to have been made into dogs. In China a big dog, dressed as a man, was carried about in a palanquin in times of drought. In Singapore a black dog was whipped round the kampong in the first new moon after the rice season. In Kamchatka earthquakes were attributed to Touila's dog, "Kozei."

In many countries widely separated in geography and culture, the dog was believed to bring relief from pain and sickness through the application of certain portions of his body or hairs. Europeans, for instance, held a "Spaniel gentle close to the abdomen of a patient that the fever might pass thus to the dog." The Chinese put their faith in the "blood of a white dog for the

"WOOF! WOOF!"

TO BE OR NOT TO BE

cure of lunacy." The literature of every corner of the earth abounds in stories, fresh and naïve, of the efficacy of dog "charms" and potions.

Whether or not we believe that all dogs originate from one common ancestry, the breeding of various varieties of dogs is a matter of much interest, when one considers such varying types as the Pomeranian and Newfoundland, the sleek slimness of the greyhound and the squat solidity of the bull-dog, the snub-nosed Pekinese and the slender-snouted collie. Of only one thing we may be certain—the making of various breeds dates back to ancient times. Even as early as 3500 B.C. the dog differed in types. In the Tombs we find illustrations of various kinds of dogs. In Assyrian carvings but one breed is depicted, but Egyptian relics picture several varieties, from lap dogs to dachshunds. In Egyptian hunting scenes the mastiff appears. And in the translation of a curious letter of the XIX Dynasty one reads of a large pack of hounds, described as standing daily at the door of the house to breakfast "when the amphora is opened."

With the domestication of the animal certain natural traits and habits were undoubtedly developed to abnormal stages. The setter is an example of this. An interesting volume of 1844 points out that through a series of generations the result of education in any one trait produces a "permanent" effect, or an effect sufficiently set to continue through several generations without further tuition. This may account for the fact that a town-bred spaniel of many generations of town-bred lineage often retrieves satisfactorily.

Because Great Britain has been interested in sports —and often cruel sports—since earliest times, dogs of the sporting type were developed through experiments with cross breeding to accentuate the desired qualities. The English "bull-dog" is an example of this. In the days when Queen Elizabeth and the entire British populace took pleasure in witnessing intolerable exhibitions such as "bull-baiting", this type of dog was developed. Bred and inbred to accentuate those points which would best allow it to hang to the bull, the result was an animal of peculiar face formation, great width of body and bent legs.

In the dog, as in the child, one may witness the effects of constant control and education. M. Buffon, the French naturalist, in a work written in 1790, stated that dogs transplanted to the highly civilized circles of France, England and Germany, became so civilized that they will always possess a refinement and quality that will never be apparent in the rough-coated and less domesticated animals acting as sheep dogs in the wilder areas. Even a superficial observer of dogs is able to trace in the animal coming from a cultured household certain indefinable qualities of refinement which he has mysteriously and subtly acquired from his owners. Likewise, the dog of a man who lives by his wits acquires something of his master's cunning.

The evolution of dog breeds is, however, an enormous subject. A major factor has been isolation, with owners breeding dogs suited to the purposes of the day on their estates, in villages or on farms. The interesting results of these efforts are apparent in our present-day lordly police dogs, gentle collies, roguish terriers, pugnacious bull-dogs,

COLLIE

noble Danes and St. Bernards, and aristocratic wolfhounds.

Perhaps the most lovable of these breeds is the terrier —a classification that covers many ramifications. In general, however, his roguish mischievousness and utter devotion are irresistible. What is more appealing than a little Scotch or Irish terrier tearing and sliding across the hall rugs in a race to greet one effusively after a few moments' separation? They are so game, with their fiery eyes and alert expressions, their keen intelligence, and that air of tousled innocence that not even the recent chewing up of an evening slipper or knowledge of muddy footprints on a silken coverlet can quite erase.

There are those who like the sedate aloofness of the Boston bull terrier—a strictly American product. And certainly there is a definite attractiveness about these clean, well-knit, trim little creatures.

A "man's dog" in every way is the police, or German shepherd dog. In Paris each year a review and parade of police dogs is held in the courtyard of the City Barracks by the prefect of police. The assembled dogs, at a sign from their keepers, give three regulation barks and are then put through their paces, eventually forming fours and marching past the prefect, turning with remarkable precision and obedience at the word of command and receiving extra rations of bones as a reward for their intelligence. The city of Ghent, in Belgium, claims to be the first town to promote the police dog to an official position on the police force. Today there are forty-three dogs attached to the Ghent force, hardy, fierce, untiring animals who go on night patrol duty. Their first lesson has been unhesitating obedience. Then they are taught to seize the hand of an escaping man. A man so seized, police declare, is practically hors de combat.

THE MICK

THE ROGUE

Literature is replete with anecdotes attesting to the intelligence, the sagacity, the fidelity of dogs —some so astounding they strain the credulity of the most ardent champion. But one who has known the joy of a dog's companionship can often relate stories quite as astounding. I have seen unmistakable evidence, for instance, in one or another of the dogs I have owned at various times, of a real sense of

humor, quite aside from a sense of play; and a sense of time, quite apart from appetites. I have also observed that the more sympathetic a dog is, the more highly-strung he is, and, like humans, more sensitive to the moods of those around him.

Recently I came upon a quaint manuscript, dated February 5, 1753, in which a dog pleads exemption from taxes for the "barking fraternity" of Great Britain.

"Thanks to all the gods and goddesses who have ever honored the race of dogs, their gracious divinities have at length in compassion to wretched dogs, permitted a poor cur to open articulately," begins the animal, and then strongly exhorts, "For heaven's sake, as you are stout, be merciful. Consider, gentlemen, we are animals and not such senseless machines as you men are pleased sometimes to make us: We have a feeling of pain, a sense of pleasure, tread the same earth, are warmed by the same sun as our masters." The dog's closing plea is this: "Whilst therefore you are promising yourselves Elysian scenes, we dogs are not allowed a thought of anything beyond animal life. The dogs of India are happier in this respect, for their masters carry them with them into the other world. But as in this part of the globe dogs die and are no more, every reasonable and humane mind would not only use every method to lengthen that little period, but likewise make it as happy as possible." And, considering man's compensations, what more fitting closing than the words of this honorable British dog?

FARMING TREES

BY FRANK C. PELLETT

BECAUSE it takes a long time for a tree to reach the age where it can be marketed profitably, most land owners are overlooking the opportunity offered by the growing of trees on land otherwise unproductive. Few, indeed, are the farms which do not include some acreage of little use for ordinary crops. On such land it is possible to grow a crop of trees which will provide a good return even though it is necessary to wait many years for the harvest.

For ten years past I have been planting a few pine trees each year on my farm in Holt County, Nebraska. In that county there are many acres of land unsuited for ordinary farm crops.

More than thirty years ago the Federal government made an experimental planting of trees on some of the poorest land. The black pine or jack pine proved best adapted to the locality. The average annual growth has been reported as nearly thirteen hundred board feet per acre. At present cost of even inferior lumber, it is doubtful whether a much better investment is available. The owner must pay taxes on his land whether he uses it or not, and except for the cost of the trees and the labor of planting, there is little further attention needed.

At present prices of seedling trees, fifteen dollars will pay the cost of trees and planting for an acre. Fences must be provided to keep out livestock, for cattle and young trees do not thrive together. The land the Federal government planted thirty years ago is now appraised at $300 the acre, although it formerly had little value. After the first ten years some return can be secured from trees which should be removed for the benefit of the plantation.

If idle lands on American farms were thus utilized there should be no shortage of lumber for all purposes a generation hence. The profits which would accrue would be a net addition to the resources of the individuals concerned as well as the nation, since little use will be otherwise made of such land.

THE TREE FARMER AND HIS CROP
Besides being profitable, the trees bring shelter against the wind, and many new birds

In localities where state grown trees can be secured at low prices, the cost of planting is much below the figures mentioned. The trees which I plant must be bought at a commercial nursery in another state with express charges added. About one thousand trees are necessary for each acre planted.

The first trees, set in 1918, are now fifteen or more feet in height. They add much to the attractions of the farm; also providing splendid winter protection from cold winds, and nesting sites for numerous birds not previously seen there. Farming trees, I have found, is very profitable.

THE CARE OF RODENTS

NO CHILD SHOULD MISS THE FUN THEY SUPPLY

BY HELEN DOLMAN
MICHIGAN STATE NORMAL COLLEGE

NEXT to the domestic cat and dog, I doubt if any animal holds as dear a place in children's hearts as does the rabbit. From the Mad March Hare to Peter Rabbit, from Brer' Rabbit to Raggylug, the writer of children's stories has found in this soft, cuddly little creature an appealing hero. Yet many children have had no actual experience with this playmate of their fancy. I sometimes wonder if to the city-bred child's mind, a rabbit is not a two-legged animal wearing overalls and a straw hat, just as he steps out of their bedtime stories. I wonder how many know the real rabbit.

Even the apartment-bred child, if he has a patch of earth five feet square, can know the joy of possessing and rearing some member of this family. They are so easily cared for and return so much fun for the investment, that no child should miss the pleasure they give.

LYNWOOD M. CHACE

THE MOST POPULAR PET OF ALL
Friend bunny is a favorite among children, who learn much Nature from his care

Both the white rabbit and the white rat belong to the large group of rodents and have their incisor teeth adapted for gnawing. These teeth are long, curved, chisel-like, and self sharpening because of the wearing away of the soft inner surface, which is protected in front by a hard layer of enamel. As these teeth are constantly growing from the roots to replace the worn part, the animals need something to gnaw on, lest their teeth grow too long.

There are usually only two pairs of incisors, and no canines, and the jaw has accommodated itself to this reduced load by narrowing laterally. The teeth of an animal help one to understand its feeding habits.

A cage for rabbits, white rats, guinea pigs or squirrels may be made of a packing box by removing three sides and replacing them with quarter or one-half-inch wire netting. Or the cage may be constructed entirely of wire netting. I have found metal and wire cages quite satisfactory for rats, mice and guinea pigs, as they are light and easily cleaned. Any tinsmith can make of angle tin a frame work, which may be completed with wire netting at a small cost.

In case a wooden floor is used, a layer of sawdust should be spread over it. This ought to be removed each day with a small shovel. The drinking cup should be fastened to the side of the cage, a few inches from the floor, to prevent débris from getting into it.

If the cage is kept out-of-doors, a tight roof and sides should be provided for stormy weather, and it should be located in a well drained spot. White rats and mice are susceptible to colds and pneumonia and cannot stand as much cold as squirrels and rabbits. Unless their cages are well built and water proof, they need to be in a building. An open window, one freezing night, killed two families of white rats of my acquaintance.

In any event, provide sufficient nesting material, and a tight, dry, nest box. Animals like a place in which to hide and it is really cruel to put them in open cages with no such retreat. The nesting material as far as possible should be what they would choose for themselves, if they were wild. Dry grass and leaves for rabbits and squirrels, and bits of plant fiber such as cotton and paper, for rats and mice. If these materials are put into the cage, the animals will carry them into the nest box and arrange them to suit themselves.

The housing problem settled, the next item is food. Rabbits and guinea pigs eat more fresh vegetables than do rats, mice and squirrels and should be given cabbage, carrots, lettuce and other leafy vegetables. In the winter some of this food may be substituted with clover and alfalfa hay. In addition to this green food, they need oats or other grain. The smaller rodents eat more hard foods such as grains and nuts, but they also relish some green food. A varied diet is just as necessary to a lower animal as to a human being.

We give our mammals at (Continued on page 204)

THE HUNGRY KINDERGARTEN AT MEAL TIME

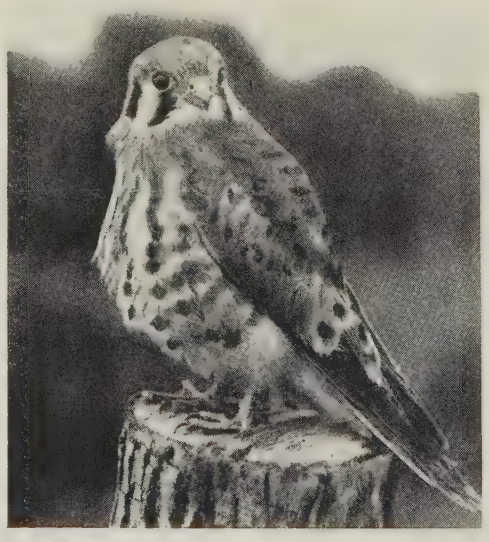
Imagine the plight of Mr. and Mrs. Roughleg, with a family like this, and no ground squirrels

KINDERGARTENS OF THE CLAN BEAK AND CLAW

WATCHING BIRDS OF PREY GROW UP

BY HAMILTON M. LAING

NATURALIST, JASPER AND BANFF NATIONAL PARKS



MAKES A FINE PET

The young sparrow hawk is a tractable fellow, and becomes fond of his captor

As THE hawks are among the most picturesque of our North American birds so their young in the cradle are easily the most interesting feathered babes of the wildwood. They are strange youngsters indeed, these little savages of the clans of Buteo, Falco, Circus and Astur, the princelings of the kings of the air and the crags and mighty tree tops.

Every one knows a hawk on sight—that is, hawk in general. There is something about the habits of the clan that appeals to the human soul. Falconry in the chivalrous days of old was not mere accident. For hawks among birds are different, and every Nature lover and outdoorsman or woman is drawn to them. We may not always like them—that is a matter of point of view, or, perhaps, of the bird's economic status—but nevertheless it is a dull eye that does not quicken at the sight of the great, broad-winged Buteos hovering over the plains, the magnificent swoop of the duck hawk, the American peregrine, after luckless waterfowl, or the dash of the winged destruction in the form of little sharp-shin.

The offspring of these folk of beak and talon have ways of their own, too, and one thing that makes them interesting to Nature lovers is that they are long available for acquaintance and study. Most difficult of all birds to reach, yes, and to really meet on account of the inaccessibility of hawk eyries; but when you do make acquaintance, how well worth while! For they remain long in the nest. Though your warbler will be gone from the cradle in about nine days or your robin in eleven or twelve, your young red-tail hawk will entertain for six weeks and the great eagle through a good part of the summer.

The psychologists tell us that mental capacity of a race may be measured by the period of youth. Man has the longest childhood because he has the most to learn. In which case the slow development of the raptorial youngsters bespeaks intelligence. For long after they are out of the nest and apparently strong on the wing, young raptors are in school still and dependent on parents for a living. The larger they are, the longer their course of instruction. Thus I have seen bald eagles killing for their young of the previous spring the following mid-winter.

Hamilton M. Laing, the author of this and other articles appearing in Nature Magazine, is a widely-known Canadian government naturalist, and was specially appointed, last summer, to accompany Nature Magazine parties through Jasper. He knows his wild life, as those on the trips will testify, and has, in addition, that rare ability to express his knowledge in vivid, captivating prose. We promise more from his pen and from his photography.

A BAD LANDING

Though youngsters invariably fly well, they are land birds, not amphibians

Young hawks do not have to learn to fly, as so many people imagine. I have repeatedly seen these young forced into making a premature flight—that is, being scared into leaving the nest a few days earlier than they otherwise would have—and in all cases they flew well, though weakly and their landing was very bad. It is a case of strength. They must wait in the nest until the flight feathers are grown and the wing muscles are strong. They know instinctively how to manipulate themselves in the air—just as young swallows or flickers, and all other birds raised in nests from which they must fly at first attempt without preliminary learning. But the young raptors do not hunt well instinctively. They must follow parents afield for a while and see how the dinners are secured before they can work into the killing trade themselves.

While in the nest their home is their castle and even when quite small most of them are capable of some considerable defence. As the feet and legs develop in advance of the wings, young Falco or Buteo is early equipped with defensive weapons which he uses freely upon any rash hand that would invade the kindergarten. It is only the young of the predatory birds that will fight so. Other fledglings mainly cower and accept any fate, but the hawk early shows the nature in him. And he strikes with his talons, not with his beak. For though all the young open mouths and droop the wings, rumple plumage and take on a most threatening attitude, or often throw themselves backward and present arms wickedly, few of them will bite a finger even when it is given them to chew. Talons, however, close instinctively on anything that moves before their clear vision.

What clear and seeing eyes these fierce little babes of the woods carry in their heads! There is an old-for-their-years gleam in them and yet withal there is always the tell-tale light of the immature. Thus the young red-tail's gray eye grows browner with each month of his youth; the yellow eye of the young sharp-shin villain becomes red when he dons the bluish coat of the adult in the second year; that of the great fierce goshawk does the same; but the falcons—sparrow-hawk, pigeon hawk and duck hawk — are brown-eyed babies and "hold their color." The great bald eagle in the kindergarten is a brown-eyed eaglet, and for long afterward he is the same, for it takes him four seasons to grow to the splendid snowy-headed

HE PROVED EASY TO TAME

Brownie, the Harlan's red-tail, was driven by hunger back to his master. Note the lump under his chin

YOUNG MARSH HAWKS ON THEIR GROUND NEST

Most jealous of their safety are the parents, who shriek wild fury at intruders as they swoop close to invading heads

A YOUNG RED-TAILED HAWK
Despite his haughty bearing, he is but an infant, weak of wing and dependent on his parents

and gleaming-tailed maturity of an adult king of the air. Then he carries below his imperious brow that clear yellow-gray jewel of an eye that is a large part of his savage and haughty mien.

Perhaps a little of the ferocity of these armed babes in their eyries is due to the encouragement they usually receive from the parents. None could be more solicitous for the young. Climb to the red-tail's nest and the parents hoarsely scream protest, sweeping down often within gunshot. At eyrie of duck hawk or prairie falcon in the cliff you are very liable for a surprise. I have seen these birds, also Swainson's and the ferruginous rough-leg of the plains, sweep down from the sky like a meteor with the whish of a half-spent shell and miss the intruder's head by but a foot or two. And I have yet to see a man who will not duck! Even the skinny marsh hawk, a mere bunch of feathers, will wickedly swoop at the head of a visitor at his ground nest. Sometimes the golden eagle will give an intruder uneasy moments, too, and the nest-mad goshawk is possessed of a devil.

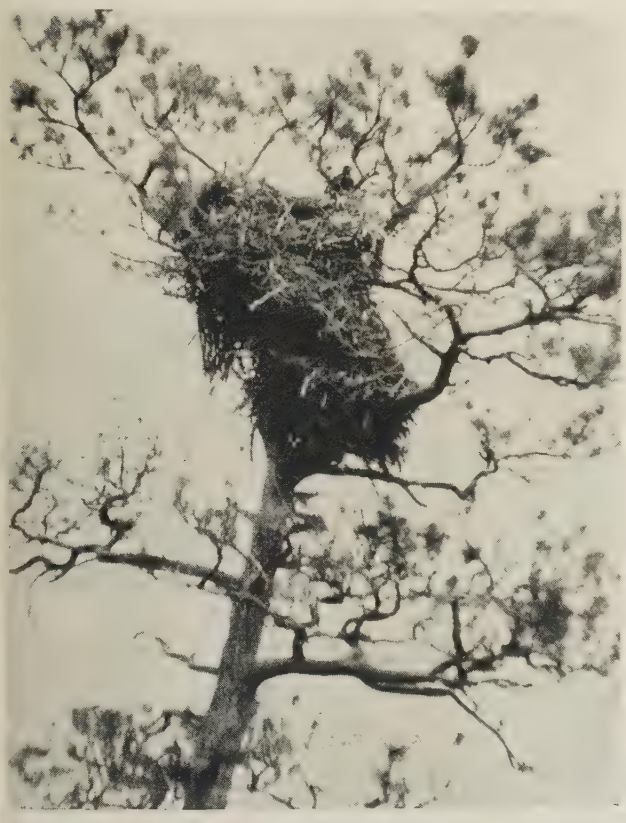
The goshawk, magnificent in his savagery, is the only hawk parent that will habitually strike a human being. An enthusiastic egg-collecting friend of Alberta assures me of dozens of cases. In fact he says he "uses up a new boy" every spring in the goshawk season—his climber never caring to carry on at the job a second spring. This, too, despite the fact that the collector always stands by with a club and does his utmost to shoo off the red-eyed assassins. I myself have had these killers about my ears several times with but slight provocation. On one occasion I found a goshawk's tail sticking out of an old nest some thirty-five feet aloft in a poplar. Standing directly below the nest and looking up, I gave the hoot of the horned owl. The result surpassed even expectation. For with a scream of fury the red-eyed old female sprung over the nest-rim and shot down straight for my face and I probably escaped a clawing by instinctively throwing myself backward and striking out wildly with my gunbarrel. The old Tartar followed me shrilling with rage, striking whenever I turned my back and almost compelled me to walk backward for a hundred yards. Is it any wonder then that these babes of the predatory clans, chips of such blocks, show a little of the same grain and fiber? They are born and bred to their savagery.

THE MOST FEARLESS AND AGREEABLE
Of all the big Buteos, the young ferruginous rough-legs of the plains are most friendly to man

Hawk parents of course are most concerned or savage about the nest when it contains small young—in which respect they are like other birds. In the raptors the females are larger than their mates, and usually in defense of the young they are more fierce. We might expect the youngsters possessing such guardians to live the safest of lives, far removed from the terrible calamities of so many sorts that wreck the hopes of other birds. But young raptors have their enemies other than man. Why is it that so many species of nesting hawks will hasten to the sound of the hooting of the horned owl? I have called up many hawks so. Undoubtedly because such birds know their enemies. The big-eyed destroyer work-

ing in the dark doubtless sometimes eats hawk babies, just as he does young crows. At any rate they one and all hate him. An eye witness described to me how a marsh hawk on sighting a horned owl on the wing by day, struck him wickedly; and I once saw a Swainson's hawk launch himself out of the blue in a beautiful swoop to strike into a willow clump at a long-eared owl, which doubtless he mistook for the larger horned demon of the woods.

A curious hawk trait I have noted in the kindergartens of the Buteos (the various red-tails and the Swainson's particularly) is their fondness for a leafy green bough. This sprig of leafage—usually poplar has been noted—is deposited there by the parents, but its purpose has never been plain—whether to do with the ornamental, or the sanitary, or to serve as plaything. Sometimes several of the older boughs with shrivelled leaves are found



BUILT FOR PERMANENCE AND LONG USE

The eyrie of the bald eagle took years of building, and here the eaglet spends the entire summer

on the nest, showing that a new sprig is added as desired. In addition to the Buteos, the golden eagle shows the same trait.

The abundance or scarcity of small mammals is a factor that plays a large part in the nest life of many of the hawks. Kindergarten and food supply are tightly linked. In fact if we study closely here from year to year we will find that some species at least have a system of birth control and a way also of adjusting families to the food available. This is shown very clearly in the case of the goshawk. Over the woods of Canada this hawk is one of the chief executioners of rabbits. Now the northern rabbits come and go in recurring cycles; at time of

READY FOR MAIDEN FLIGHT

A Krider's red-tail about to take the most important step of his life—over the edge of the nest

scarcity they are all but absent; at peak of abundance they are legion, and when they slump, they disappear in a single winter. The northern grouse, left to bear the brunt of supplying the meat bill for the raptors, soon follows the rabbits into hard times. Thus the goshawk in years of famine is forced to limit his family. Egg collectors of long experience in northern woods have assured me that sets in lean years are invariably small—as low as two—while during the rabbit years the number may be as high as five. And it takes a good deal of hard work to stifle the hunger squeals of five young goshawks even in a land of plenty.

The same holds true of the squirrel-killers of the plains—red-tail, Swainson's and ferruginous rough-leg. Of these the rough-leg normally raises the largest family, five young being common. Imagine the plight then of hard-working Mr. and Mrs. Rough-leg with five hungry young and no ground squirrels. So in lean seasons the lady just does not lay more than a couple of eggs or if the usual family arrives and there is no grub—well, Nature merely takes its course. The strongest in the kindergarten survives and—horrible thought—he probably aids the family economy by digesting his weaker brothers and sisters.

There is always a noticeable difference in the size of the young hawks in any nest. There is, in fact, a progression of sizes. At first glance this looks like poor management of parents, for the bully and greedy one gets more than his share of the provender. But this is not the

case at all, and all is quite as it should be. We must go farther back than feeding time to understand this. For hawks incubate as soon as they lay, the female being fed on the nest a good deal by the chivalrous male. Thus in a family of five the first to arrive from the egg is very likely to be a week ahead of his more belated brothers and able to get away to a flying start in more ways than one.

It is at the time when the young take to their new wings and leave the nest that we see the fitness of this domestic arrangement and realize how different in this respect hawks are from most other birds. For example, a grouse or wild duck mother lays an egg a day until the set of a dozen is complete and then takes to incubating so that all the brood will emerge within an hour, be equally strong and leave the nest as a unit. The cradle means nothing to such young birds a few hours after they are hatched. Their kindergarten is the world itself. With hawks it is quite the reverse. It seems much more to the advantage of the parents as well as of the young to have a gradual breaking up of the nest unit. Such youngsters are not precocious, and getting one at a time safely off on the wing seems task and anxiety enough. Then when the stronger have left the nest, the rest fare better.

Young birds of prey seldom return to the nursery after they have left it. The maiden flight is one of the biggest events of young Buteo's life—probably more full of thrills than the capture, unaided, of his first victim. As the day and hour approaches, the young stand and scan the airy world, feel the urge in them and the power in their wings, yet hesitate. The parents now are extremely anxious and noisy. We can only guess what is in the heads of old and young and the pride both feel when the first of the youngsters is aloft with the wind under him, breasting the breeze like his elders.

Last summer I camped near young ospreys in their great nest. For weeks the three stood tall on their platform and for some time seemed the size of their parents, and yet they remained. What a noisy family!—the young shrilly whistling on the nest in reply to the plaints of parents aloft, the clamor redoubled every time one of the latter appeared on the horizon with a fish. Then one day of extra rumpus it happened—three ospreys were on the wing, and earth and air were full of the whistled tidings. Yet one youngster returned to his nest; and it was not for several days that the great picturesque castle of sticks was empty and the freedom of the air was the possession of all five.

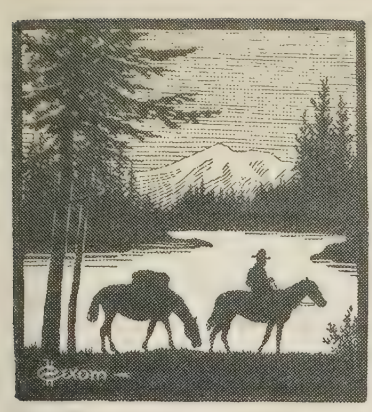
There is no kindergarten of the raptors so noisy as that of the fish hawks, but a good deal of this may be due to their tardy development. While most of the young have voices developed quite early in their nest life—for there is little need of silence from these babes that do not win safety by concealment—it is not until the young are well grown that we hear much of them. The plaintive "Kle-eee!" of young red-tail then travels far abroad; the shrill scream of the young goshawk cuts through the woods with the soulless protest of saw under file; the little sparrowhawks, a half dozen strong in the old flicker hole, raise lusty clamor; pigeon hawks also make great outcry—their voices shrill and tuneless as are those of other raptors. I have never heard young marsh hawks raising a clamor from their ground nest—if their grassy mat could be so called—but they are loud enough after they attain flight—especially when they sight Papa Circus homeward bound with a mouse or ground squirrel dangling from his long legs.

Savage by nature as are these babes of the raptorial clans, yet they differ vastly. Of the big Buteos, I have found the ferruginous rough-legs of the plains the most fearless and agreeable in the nest. Almost any hawkling taken from parents will soon respond to kindness and show appreciation toward the hand that feeds him. I have seen a young sparrow hawk showing almost the attachment of a dog for its captor. The falcons in this respect possess far more intelligence and kindliness than the Buteos, while the goshawk is almost untameable.

In Alaska one day I brought home to my lonely camp a young Harlan's red-tail that had just left the nest, and a goshawk of the same age. In order to avoid complications I tethered them to perches under spruce trees and undertook to give them a new line of education. Brownie, the red-tail, was soon quite a pet. Demon at the end of ten days was still a savage, and when he cut his leash and took to the woods I shot him as I feared he would attempt to kill the young Buteo. Then, necessity compelling my absence from camp for several days, I left some food with the red-tail, slipped his leash and wished him good luck. On my return three days later, there was no Brownie—and the food lay untouched.

Then I heard him calling. For two days I tried to find him in the spruce woods and failed because when I went hunting for him he always hushed his cry. I knew he was starving, but as yet he was in a liberty-or-death frame of mind and scorned surrender. Then the prodigal returned —hopping over a brush-pile, rushing me with a long-lost-brother eagerness that was touching. He called his hunger cry, put down his wings and begged with open mouth in the manner of all fledglings. He seized upon some knuckle-bones from the sheep skin I was working upon and tried to bolt them. He was hungry! So I stuffed him with a meal of fresh meat, and then with a great lump under his chin he sat and watched me. Henceforth he haunted the camp and each day about noon came and gave his plaintive "Kle-eee!" and took his huge meal of whatever I had to offer in the way of fresh meat—usually a fat ground squirrel.

Yet, huge as seem the meals of these meat-eating hawklets, sometimes it can be shown that compared to many of our fledglings they are comparatively abstemious. A young insectivorous bird, for example, in proportion to his bulk, requires vastly more food. A young robin is naturally a glutton, consuming his own weight of provender in a short time. No hawk baby is such a gourmand. Fledglings of our commoner birds when deprived of food die in a few hours; the hardy hawklings persist for days, even as my bird friend, Brownie the young red-tail, did.



THE LURE OF THE TRAIL

BY INES STEARNS MACAULAY

In this story the author has expressed the story of the trail as members of the Nature Magazine Vagabonds of the Trail groups have come to know it. Once again in 1931 the Vagabonds will take to the trail and their plans are described in a booklet, "On Western Trails". It will be sent you on request.

THANK God for mountains! Here man with his passion for road-building is baffled and the automobile must give way to travel by horse and foot. Back to the ancient trails of the Indians, back to the primitive life of his ancestors man must go if he wishes to go farther. The majority of modern folks, used to smooth roads and good hotels, stop. They pause for a few moments at the road's end, look up at the peaks that tower, crag upon crag and precipice upon precipice, clean to the sapphire sky it seems, then climb into their cars, turn and go back to plains, cities and billboarded highways.

"We have seen the mountains," they say boldly.

They have seen them, but they have not conquered them. Only a few of the hardiest souls, only those who feel deep in their hearts the mysterious call of the open will go out on the lonely rocky trails and really know the mountains. They are the ones who love the roar of white torrents tumbling down rocky gorges in thunderous beauty. They are those who love the breathless beauty of still mornings when the dawn comes radiantly over

H. ARMSTRONG ROBERTS

Grub by the side of the trail in the Canadian Rockies. How good it tastes after a morning on the mountain trails, breathing the free, fresh air of the high places

H. ARMSTRONG ROBERTS

Down the trail into the Grand Canyon with the delightful Phantom Ranch at the bottom of the Canyon as a goal

The Grand Canyon of the Yellowstone, jewelled by the Great Fall, twice higher than Niagara, presents an unequalled spectacle of blazing gold and crimson to the visitors in the Yellowstone

splintered peaks cut with cameo-like clearness against deep blue skies. They are the men and women who love horses and the music of their hoofs on trails that wind through groves of glittering aspens. They are those who love the sudden swift rain-storms of the mountains and after the rain the hot kiss of the sun.

Men and women who are trail-lovers rise with the dawn and spend laborious happy days in the saddle or on foot following the trails that lead up and down, curving around switch-backs, zig-zagging up precipitous rock-slides, slithering down deep-walled canyons, pausing at blue alpine lakes and then going on again to the very tops of those peaks of the Front Range that form the very crest of the continent.

Trail-lovers are friendly people. When a man travels half a day with only the sound of his horse's feet and the deep murmur of wind in the pines for company, he is glad to stop and greet another coming down the trail.

"How far to the Lake?" he asks hopefully, for somehow mountain miles are the longest in the world.

"You're nearly there, the worst bit is just ahead—trail muddy from yesterday's rain, better go up just beyond the falls." Friendly words cheer the traveler's heart and he goes eagerly on. For the lure of the trail is that you never know what is just around

NORTHERN PACIFIC RAILWAY

this curve or over beyond that mountain! You may, if you are lucky, surprise a breed of Magdalena butterflies, those rare specimens eagerly sought by entomologists, butterflies of a dead, jet-black that flutter up and down rock-slides and cross snowy glaciers at an elevation of 11,000 or 12,000 feet. Or you may find growing along the trail the fragrant, deep-blue gentian and ever afterwards carry its beauty in your heart. Perhaps you will sniff the air and smell the delicious odor of wild blueberries hot in the sunshine. Or on the other side of that mountain you may come upon the wild beauty of a waterfall, sending its cool spray far up among the tall spruce.

As the dusk deepens over the trail and the stars flash out one by one in the blue sky, you may chance to hear the entrancing song of the water-ouzel, a liquid, bubbling shower of notes. If you are lucky and walking alone on the forest trail you may look ahead and see the brown, graceful form of a deer cross your path to disappear with leaping, silent bounds into the green, shadowy forest.

These are the rewards of him who leaves the crowded, main-travelled roads and goes out on the twisting mountain trails. These are the lovely memories that will come to him when winter winds whistle around his snug fireside.

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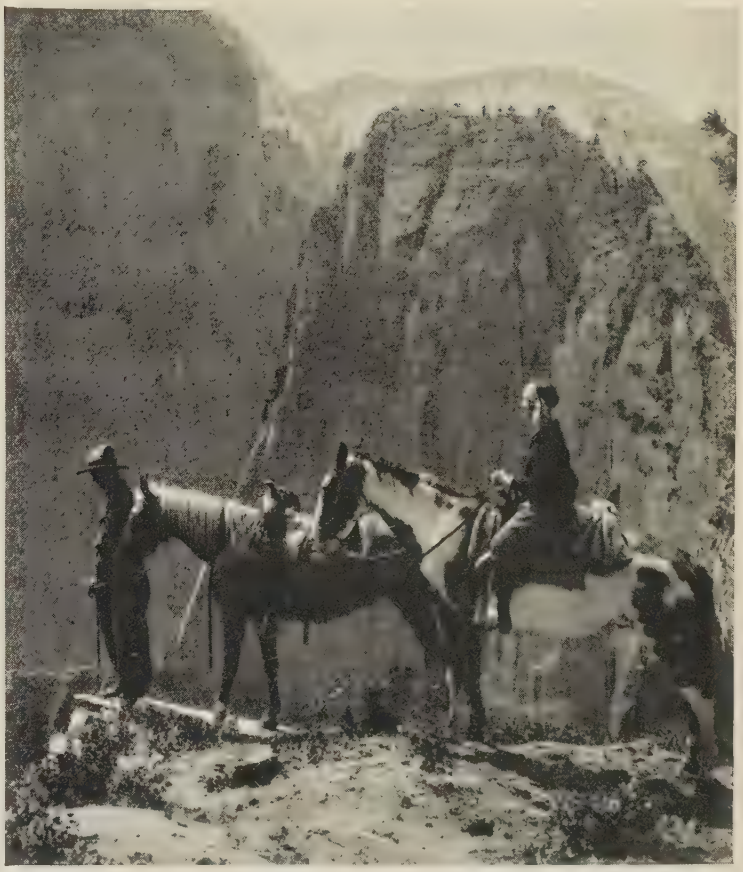


H. ARMSTRONG ROBERTS

The trail in Zion National Park leads one to this sublime view from the west rim of Zion Canyon where one looks down on the Park

The end of the trail from Medicine Lake to glorious Maligne Lake with its rim of snow-clad peaks and ever-changing lights at sunset

CANADIAN NATIONAL RAILWAYS

It is such experiences, such thrills and such happiness in the open, as are described in the pages that have gone before this, that the members of the American Nature Association parties will have this coming summer. In getting "On Western Trails" ready

The trail around glorious Mt. Rainier leads across a snowbank. He who has not ridden thus has something to live for

Here one starts for the trails of Glacier National Park and from this hitch rack have started six different Nature Magazine parties, seeking the glories of the mountains beyond the ridge

H. ARMSTRONG ROBERTS

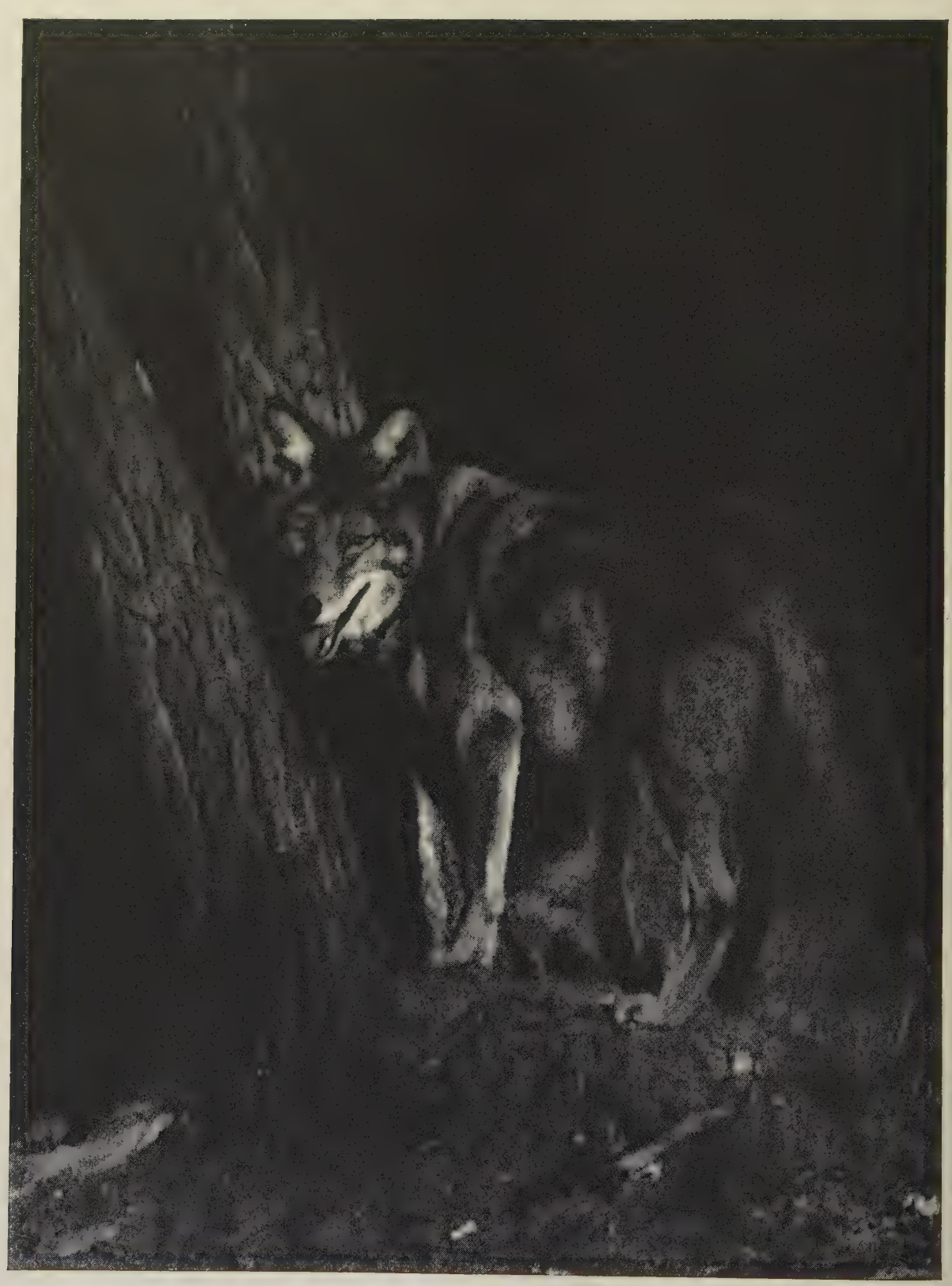
for its 1931 edition, the Director of Field Trips finds himself eager again to take to the open trail.

There is a permanence to the memory of a place visited when it has required some effort to visit it. Certainly one can never forget the picture of the sun painting its evening hues on the mountains about Maligne Lake. The crags of the Ten Peaks at Moraine Lake etched against a blue sky must ever be a fresh mind picture. The campfire at Granite Park Chalets in Glacier burns just as steadily despite passing years. The first incomprehending gasp as one looks into the Grand Canyon of the Colorado will ever come back out of the past. The gorgeous picture of the Grand Canyon of the Yellowstone; of the lovely Falls of the Yosemite; of the great trees of Sequoia or of the clean white beauty of Rainier are memories worthy of the effort and the cost.

We Americans have a recreational wealth untold. We have set it aside in the form of National Parks that we may preserve it for those to come. We have developed those places that the many may come and see part of them. We have developed other parts just enough so that fewer may come and see all of them. The American Nature Association Vagabonds of the Trail may be among these fewer, but it is to be hoped that all of our members may be numbered at least among the many.

On the banks of the Merced River in Yosemite National Park. In such a region the Nature Vagabonds will follow the trails

Many are the glories of the high Sierra in Sequoia National Park, and not the least of these is this true yosemite canyon called River Valley



HE LOOKED BACK INTO
THE FLICKERING LIGHT,
AND THEN WAS GONE

GRAY DUSK—THE WILD CALLED AND HE DID NOT ANSWER

The lean, gray wanderer of the plains forsook the hard life of the open for comfort as a pet

COYOTE OF THE PLAINS

FEARLESS AND ASTONISHINGLY BEAUTIFUL WAS HE

BY LORENE SQUIRE

ILLUSTRATIONS © BY THE AUTHOR

I RAISED my eyes from the glow of the campfire to the glow of the rising moon. Over a lonely sandhill it sailed between the gnarled, gaunt skeletons of two dead willow trees. I wrapped a sweater closer about small Buddy's shoulders and directed younger brother to stop fixing the tent and listen.

"What's that?" breathed Buddy, round-eyed, as a soft quavering of fairy bells sounded from the willow trees.

"That," said younger brother, "is a screech owl."

"What's that?" asked Buddy as great wings rushed over and there floated down to us a ghostly "quark."

"A night heron," growled Harris. "Now are you going to ask any more questions?"

"I only wanted—"

"Hush."

Where the sandhills of Chikaskia river merge into the wide sweep of prairie a coyote barked. Then he spoke his eerie music to the rising moon. Not far off, atop a sandhill, a coyote wailed answer, and as he wailed another broke into short, high-pitched cries cascading over one another into the summer night. All of life spoke in that song—its ecstasy, its adventure, its wild, mad joy, its tragedy. And somewhere out of the dark a coyote chuckled a weird, cruel laugh. Buddy crouched close to me.

"I know there's a hundred of them," he gasped.

"There are perhaps as many as three," said Harris.

In the glow of the campfire a shaggy, wolfish form raised his crafty head, pointed ears alert and amber eyes alight. The dog by the campfire sounded a velvety guttural bark. Then raised his slender muzzle to the stars and wailed a wild, deep-throated song. His was the song of the coyote, for the dog by the campfire was a coyote.

Finally the mournful, crazy music dwindled into nothingness and the coyote by the campfire barked and was silent. He shook himself and sank back on his haunches for a moment in the golden, wavering light. He grinned

at us three across the fire, then trotted around to us. I stretched out my hand and ruffled his ears, stroked his gray, silken and rather thin coat of summer fur. The amber eyes stared into mine, the while he elfinly grinned. The rose-petal tongue caressed my finger tips. Then out of the campfire light into the shadowy gloom of the sandhills the coyote was gone.

"Aren't you afraid he might not come back?" said Buddy.

"That coyote," said brother firmly, "always comes back. And now, Buddy, I don't want you to start getting it into your head that all coyotes are like that Gray Dusk and go up and pat any coyote that some one keeps at the end of a chain. This one's what you would call a miracle coyote. He's a dog only he's more than a dog. He's—well—"

WAITING FOR HIS MISTRESS

Gray Dusk peers back along the snowy pathway for company

GRAY DUSK AND YOUNGER BROTHER

The coyote was a good natured, alert little fellow whom the wild could not hold

"A coyote," I explained to Buddy, "is part a drift of prairie wind and he's part like your little dog Trix. And then he's the lone gypsy, always wandering, and part of him is the great gray wolf—"

"And the rest of him is plain devil," Harris interrupted. "Buddy, the coyote is a mean, sneaking, cowardly, low-down chicken stealer. Gray Dusk, he isn't a coyote. He's a plain contradiction."

"Buddy," I said firmly, "listen to me. Gray Dusk is the same as all coyotes except when he was a puppy he was perhaps a great deal more cross and mean-tempered than most. We merely brought out in him the good that is in all coyotes—the little dog Trix part. Of course there are yet the gray wolf and the wandering gypsy in him. He'll never cringe or beg like a dog. There'll always be the distances of prairie in his eyes—the mockery at my scolding. He'll always be his independent, airy, devilish self. But he'll love us, Buddy."

"Yes, Buddy, remember this," directed Harris gravely, "when a man tells you that a coyote has no more affection than a rattlesnake and that a coyote is always treacherous and that you can't tame one but that he will fly at your throat or turn wild and run away, you tell that man that he is much mistaken because once upon a time there was a coyote

JST A SMALL PUPPY
Gracefully learning to live the life of humans

amed Gray Dusk and he lived in the mid-dle of the Kansas prairie."

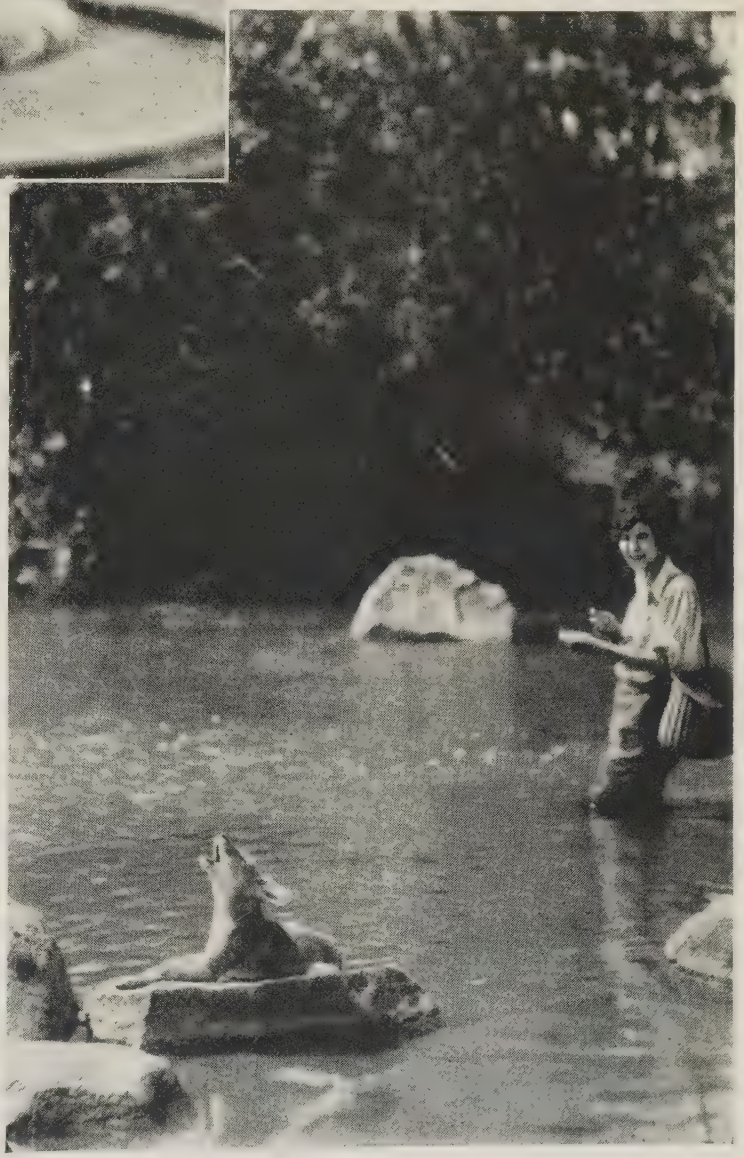
Buddy turned great blue eyes like flowers ward mine and said, "Tell me the story bout Gray Dusk."

"Again? All of it?"

"Yes—from where he was a little, teeny hby coyote and drank milk out of a bottle."

Brother grinned at me. Little Buddy was ightened by the great gloom of sandhills utside the campfire light. And so we told im again the story of Gray Dusk.

It was the story of a half-grown wolf ppy, dug from a den in these same sand-lills. He was the son of Kywoitin whose ory is a saga in itself. Gray Dusk was a ood-natured alert little fellow who grew p in our backyard playing with the neigh-ors' children. He was easily startled by loud oises but otherwise very much like a young olice dog. At the age of two months he gan to revert to the wild as everyone said would. He became an ungainly, long-gged wolf who thought nothing of a ten ile jaunt before breakfast, and who was ways hungry and always in trouble. We ere repeatedly disengaging him from the ed jaws of a trap, nursing him back to life ter he was shot by some farmer or hunter, eviving him after he'd eaten poisoned bait. No day was complete without a phone call to tell us that our coyote was robbing a hen roost or doing away with a flock of turkeys. He had a debonair, foxy charm that somehow spared him the judgment that should have been meted out to him. As he grew older, having had to suffer none of the hardships to which the average coyote in the wild is heir to, Gray Dusk grew sleek and full furred. This heavy gray fur upon his slight, lithesome body gave him the look of a cloud of smoke slouching over the Kansas prairie. He had the airy, sharp daintiness of the fox, but his negligent, loose-jointed trot was typical of the coyote. He remained casually about our cottage by Iris Lake that first summer and winter. We fed him generously but he was never satisfied until he had foraged into the next county just to see what



NO AID TO QUIET FISHING
Finding the chill waters beyond his courage, Gray Dusk sits and howls mournfully about it

might perchance turn up.

As any other coyote, raised with careful kindness, he was totally without fear of us, nor was he ever vicious or bad tempered. We had long ago refuted the foolish belief that a coyote is at heart a treacherous or cowardly animal. But we were not prepared for his strange devotion and fairy gentleness. There was no astonishing change in him. He came gradually to follow at our heels when we went hunting or tirelessly to trot after us when we rode horseback. He began to lose his energetic ambition to see the world, and bullet holes in his wiry, resistent body almost convinced him that robbing poultry houses was not a comfortable business. He mingled less and less with his wild brethren in the occasional fellowship of coyotes beneath the winter moon. And one winter night in Iris cottage we opened the door to a lonely wail. A gray drift of fur with the eyes of a sphinx and the grin of a satyr stood in the doorway. We patted him and he came in to curl up like a cat on the couch, his yellow eyes watching us with shrewd wisdom and mockery. He was a typical little coyote from off the prairie who followed the aloof ways of the wolf and the sly trickeries of the fox but in whose heart there flowered the faithful gentleness of the dog.

JUST TEA FOR TWO

At five weeks the coyote recognized humans as source of food, otherwise he was aloof

"Once on these Kansas plains," we told Buddy, "were the buffalo. Here were the antelope who ran so swiftly that their hoofs seemed to be on wings. The great, gray wolf's velvety howl sounded here at night—different from the coyote's because it is simple and there is no bark to it. And cougars were found here. These things go but the coyote lives on. The white man counts the coyote as a cowardly sneak. The Indians worshipped him as the spirit of wisdom and cunning. The coyote is wise, small, Buddy—"

"And very tough," added Harris.

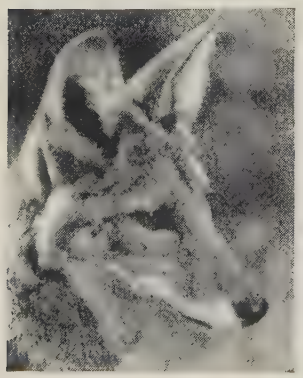
"And adaptable. But when you are an old man there won't be any coyotes left here."

Buddy thoughtfully studied the fire. "Why is it that people say all other coyotes are bad?"

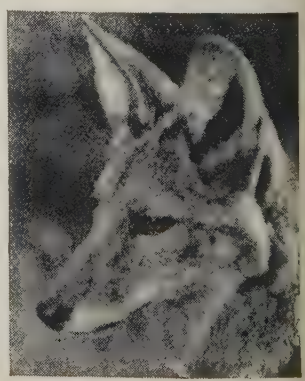
"Imagine a Kansas child asking that," Harris snorted. "The coyote has more sins against his head than any other wild animal in America. The worst thing he has done is to refuse to be killed off. He has steadily balked at being destroyed."

"Tell me about wild coyotes," demanded our small cousin.

Fifty years ago, we patiently told Buddy, the coyote was easy game. He seemed doomed upon the prairie. No one had any idea that he was merely being well educated.



Just now there is much heated discussion of the coyote and his alleged depredations. He is charged with crimes against flocks on the western ranges. Poison has been invoked against him. A price is upon his head in the land where once he roamed before man came. Miss Squire, however, has found something more in a coyote—a beautiful friend, wild and yet not wild, tamed yet untamed and untamable. May it not well be, after all, that the story has two sides?



Along in the eighties there were very few coyotes left —fewer than there are now. Man had killed off all the stupid coyotes and left those of superior cunning to propagate the race. They were the ones who had out-witted man, who had run the gauntlet of guns and traps and poison and hunting dogs and come out with a whole skin and a complete education. Those few survivors trained their young in the ways of man. And all the time man was killing off the stupid coyotes of every litter and only the clever ones were living and propagating their young.

Today the coyote next to the wolverine and not excepting the fox is the most difficult of all fur bearers to trap. It is only on the rarest occasion that one may get a shot at a coyote and yet this small wolf lives beneath man's very nose, in farming communities, even into the outskirts of cities. This little beast has learned not only to keep out of rifle range but to distinguish a man with a gun and come quite fearlessly near a man without one. He has learned to avoid carcasses of which he has the least suspicion, to outwit wolf hounds and trail hounds in a way that would astonish the fox. He has been given no mercy, no sporting chance, no sanctuary in the whole of America and he has needed none.

"But with his education," we went on, "the coyote learned of easier ways of living. He learned that sheep are tasty, that young calves may be pulled down, that hen houses and turkey pens may be raided much more easily than the dens of ground squirrels and the burrows of owls. In short, he has learned the phrase of the city streets —'The world owes me a living.' Man and the coyote disagree on this point. Man wants to slaughter his sheep and cattle himself, and send chickens and turkeys to market. He isn't particular about supporting gray ghosts to drift over Kansas plains.

"And," we concluded, "the coyote is man's enemy. And man always wins."

Gray Dusk stirred as we stopped our speech, and looked at us with mockery in his eyes. A thought smote me.

"We should have said, Buddy, that man always has won."

As Buddy and younger brother slept that night I raised my head to see a tawny, wolfish shadow trot before the fire's red embers. The coyote yawned, curled down licking his small foot pads, then stared into the shadows with sly, inscrutable eyes.

And in the smoky campfire light there sat two ghosts— a hairy man with cudgel and spear, by his side the first wolf dog. And lo, this first dog of forty thousand years ago, this dog of the dim past, was very like Gray Dusk.

MODERN STEEL CONSTRUCTION

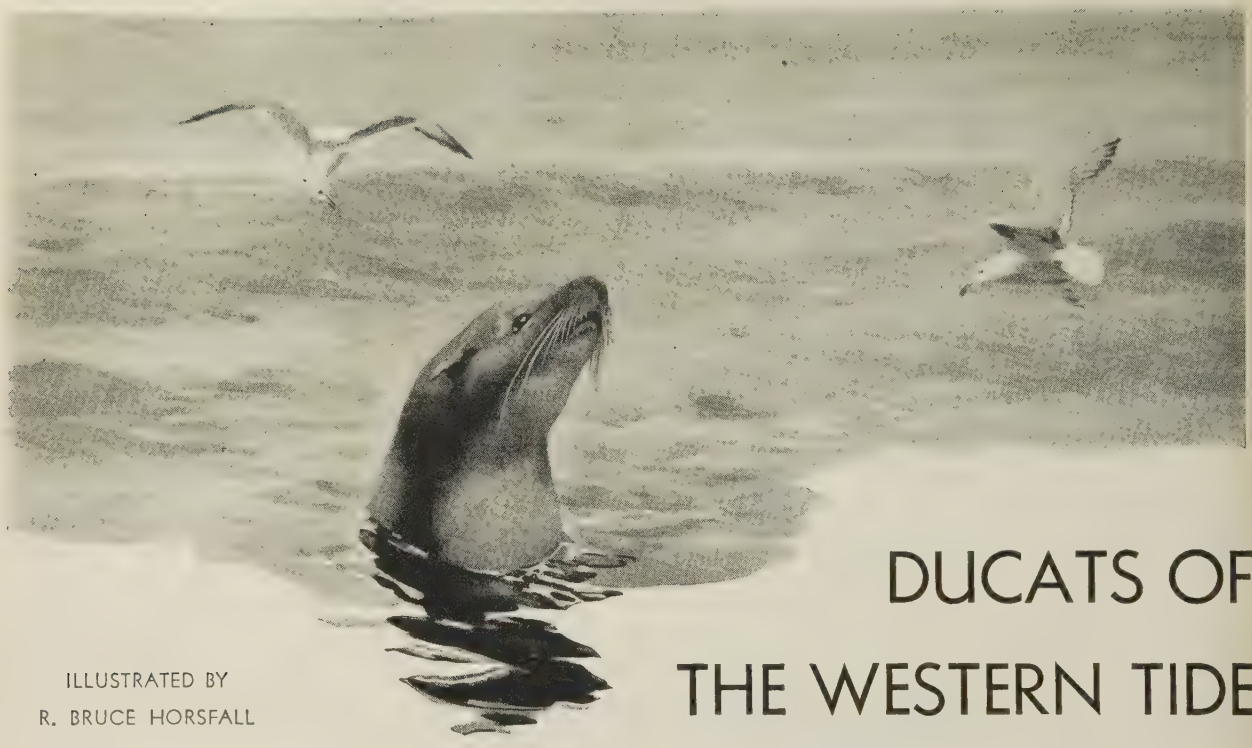
BY HELEN PATTERSON WILLIAMS

ILLUSTRATION BY THE AUTHOR

WITH a series of wren families living almost on our porch, many things of interest have come under our observation, but in all the episodes of the past ten years' intimate acquaintance, the one occurring last spring seemed to us the queerest.

Different families have, on occasion, kept after us with shrill insistence until we discovered the almost invisible vermin in the cracks of their box or until the unwanted claim-jumper of a wasp was out of their way. But we were at a loss to know what could be the matter with the nerves of the last tenant. She seemed a fit subject for an asylum, going wildly back and forth with what appeared to be the usual normal brownish twigs. Her action and her peculiar wild look finally got the better of our curiosity and, as she seemed to tire of her building with no mate in sight, we opened the door of the house. We couldn't believe our eyes! Instead of twigs, each apparent stick was a dirty, bent and rusty nail, whose iron stiffness she had been trying to adjust to her nest in vain. Can you believe it? We couldn't, but there they were, twenty-six of them to prove it. And I have them still, to convince others that we were not crazy ourselves.

No wood in this bird's building. This wren was surely up-to-date, trying out the most modern steel construction she could find. Along with the nails were a few double-pointed tacks and several pieces of wire, so she was consistent throughout, you see. Where will it all end, if the modern age affects our feathered friends like this?



ILLUSTRATED BY
R. BRUCE HORSFALL

DUCATS OF THE WESTERN TIDE

BY BEN HUR LAMPMAN

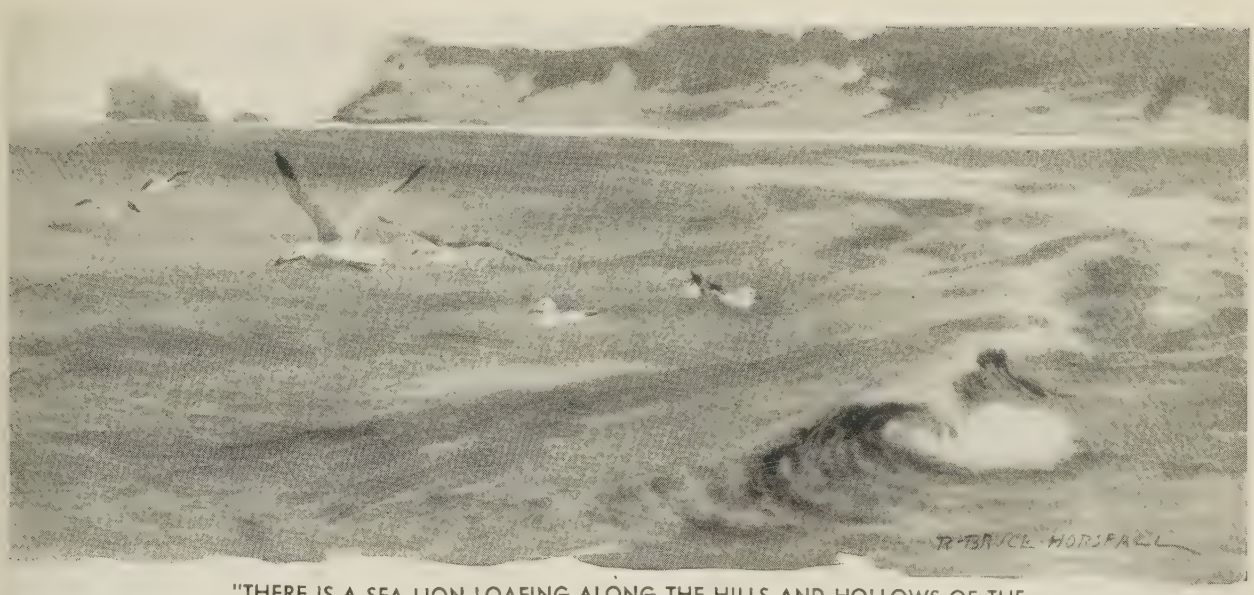
THERE is a sea lion loafing along the hills and hollows of the green seas, barely outside the breakers. The western sun strikes glints of gold from its head, which is upborne from the ocean as a swimmer of our own would bear his head in like case. And the distant countenance of the sea lion, thus glimpsed, is oddly human, so that there seems no strangeness in the thought that men have spoken earnestly of mermaids and of mermen. Huge cousin of the fur seal, brown culprit of the Pacific, with a price on your pate and the hatred of men turned against you, what forage are you finding where the kelp swings? Sir, or madam, as may chance, here is a fisherman who bears you no ill will, nor levels a rifle at you in your pastures, nor hunts you where you haul ashore. Good fishing!

There are no salmon in the tides today, no homing steel-head running toward their rivers, for all the salmon clans are far out yonder, "where the low sky mates with the sea." And if you fish for your dinner at this season, old friar of the surges, doubtless you do so without infringement of the rights of man, who has the salmon for his own; and who must require your life of you to punish that fraternity of appetite which bids you, too, confess a fondness for the red flesh of the fattened silverside, the savor of the regal Chinook. What lowly quarry draws you sleekly down? He is gone. The hollow of the wave is empty. The tide turns strongly, and the black rocks resist.

What are fishes? They are mystery. They rise from an element alien and fearful to us. They live where we must perish, and die where we must live. We also were spawned by the sea, and the sea's call quickens us as nothing else, but at long last we stand beside the sea as children—who have been long away, and who have forgotten all save that which the blood remembers. It is a fault in many men, and chiefly these are such as call themselves anglers, that they esteem no fish but is patrician—the bronzed bass, with his odor as of flowers and his heart as of a hero; the salmon, dressed in knightly mail, with song and story to praise him; the tarpon that is, after all, but a herring grown great and glorious; and sundry gallant fish of like merit. But if our sea lion dines today, he stoops to meaner fish—perhaps to the sea perch that throng those very waters where he swims—and if your heart goes out to fish, you must, like the sea lion, make a virtue of necessity. All fishes are mystery, and some that are accounted lowly are very comely to perceive, and have wisdom for those who do not disregard them.

Cast to the left, with pliant arm, that the bait shall fall in the first whiteness of the breakers, beyond the leathern kelp, the reef of mussels, the most attentive gulls. Here is a wind from ocean, fit to blow away your humors. Here is a wind from the sea, and there is strength and joy in the spray. If it drench you to flinching skin, there is no harm in it. It is the wine of living.

This is a sea perch you have caught, or a surf fish—which is the better name—and of excellent proportions, weighing perhaps three pounds. The strike was instant and heavy, though the fish lacked heart to endure. Yet there were moments when the light linen cord ran hissingly through the hissing seas, and the unseen strength



"THERE IS A SEA LION LOAFING ALONG THE HILLS AND HOLLOWS OF THE GREEN SEAS, BARELY OUTSIDE THE BREAKERS"

that burdened it, and made it vital, was very actually, and even memorably, pitted against your own. Were its flesh of the best—as it is not—this fish might even be extolled by generous anglers, might have verses for its own. Nevertheless, it is a good catch, and not without profit, since he who catches fish must always capture mystery. Drive back the gulls, those reincarnated freebooters! They will have your fish away in a twinkling, and a squawking, and a screaming, if you so much as turn your back.

It is a mother fish, and she has voided her young upon the rock. They lie like ducats in a golden heap, poor infants, and each is finished as brightly as a minted coin. They are alive. They struggle against this ruthless providence that has balked them at the threshold of being. There is fear in their puny strivings. And, counted carefully—which is to say, with gentleness—it is seen that there are more than twenty of them. These we shall place, with such faint hope as one may have, in a sheltered pool near shore, and if this is done speedily they will swim quite as though—at least to our dull eyes—the mother who bore them had chosen her own time and nursery. Is there not kinship of a kind in the circumstance of their creation? She casts no eggs upon the kelp, or in the sands, or among the pebbles and shell, as do the vast majority of fishes, there to await such hazards and such fortune as might chance. With her own flesh it was ordered that she should shield her children, until an hour when they were ready to accept the endless and importunate cycle. Here, where the sea lion forages and the cormorants mount guard, the ocean has shown us one of the least of her mysteries.

The perch-like surf fishes, of which this catch was representative, are of twenty species, alike viviparous—that is to say, the young are born alive. And they are found only along the shore line of our Pacific coast, where are seventeen of the species; the coast of Japan, where are two; and in certain rivers of central California, where is a single fresh water form. Scientifically the discovery of viviparity in the Pacific surf fishes, which appoints them an interestingly important niche in ichthyology, is recorded as having been made in 1854. It seems fairly certain, however, that the early settlers of the Pacific coast states, not to mention the Indian coast tribes, must have been familiar with this reproductive peculiarity, though they could not call it by its biologic name.

The veriest novice among fishermen, who tries his fortune with the Pacific, anywhere along that western coast, returns from the fishing rocks in a state of stammering amazement. He has placed, he will tell you, a fish in a tide pool, a sort of natural creel ready to hand, and has found only a few moments later not one but twenty fish —the mother surf fish and her progeny. There is no more convincing instance of the tendency to disregard the commonplace, in our restless search for wonders, than is found in the fact that the viviparity of the Pacific surf fishes was not scientifically reported some years before it was announced by Dr. Gibbons. Not all the four-leaf clovers are out where the blue begins.

The surf fishes are perch-like in structure and semblance, and, with the exception of that single species which prefers a river habitat—and which must make the best of its enforced misnaming—they are dwellers in the surf. The giant combers along whose crests the foam is torn, the lune-green momentary valleys that dip almost to the sea's floor, the thunder that assails the headland, comprise the especial province of the surf fishes. Though at all seasons certain of them are to be found, and often to considerable numbers, in the quieter waters of bays and inlets, where they inspect pilings for such luckless food as may choose a tenement thereon, the white surf is their ancient and accustomed home. The rhythm of the tides is theirs, and with the tides they advance and retreat; and it is the tide which strips their food from the black rock, reveals the hidden crustacean, and thrusts the weaving kelp aside from the fugitive worm. To fish for them is to comprehend that theirs also is the restlessness of the tides, for the manner of their striking gives evidence that they are almost continually on the quest. Often, as a wave

"THE PERCH-LIKE SURF FISHES ARE OF TWENTY SPECIES, ALIKE VIVIPAROUS—THAT IS TO SAY, THE YOUNG ARE BORN ALIVE"

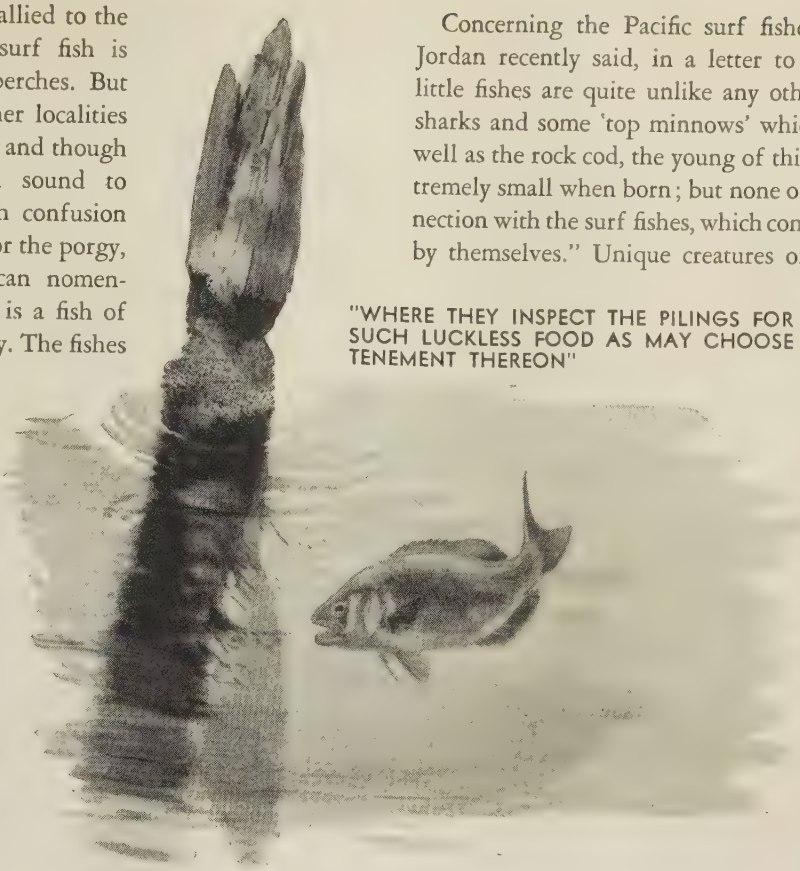
rises, they are seen in the heart of it, darkly, and it is a pity that the gleam and glow of them should be lost in silhouette.

Surf fishes are not unique in coloration. There are queer, gnomish haunters of the kelp that are almost weirdly beautiful; that have painted themselves in wondrous hues and patterns the better to mimic their environment and cheat the eye of death. But for its own pastures, which are those of the surf, the surf fish is as fittingly attired by an elder wisdom. In general, though some of the species are rather dark, the coloration ranges from purest silver to a rich golden, with only an occasional attempt at decorative embellishment. As to this last, there is a species—and one of the largest—with slanting bars of rich yellow across its pallid golden flanks, and with fins of a delicate rose. But the common hues of the surf fish, if we would generalize again, are the hues of the surf—and these suffice. It is no tenant of crevices, or hermit of sea weeds, but a fish of the tumbling silver surf. An exception to the rule is that sea perch which is most beautifully bedizened in narrow lateral bands of quite indescribable azure, and which, on being drawn from its element, seems the perfect dream of a master craftsman in enamels. Death dulls and degrades this beauty while the eye lingers on it.

Three singular buttons of pearly bone are in the gullet of the typical surf fish. They bear their surfaces together, and are thickly set with flinty nodules. The purpose of these auxiliary teeth is evident, as one must freely admit if he will undertake to explore the throat of his captive. A muscular force of no mean vigor responds, and it is this force—since the true teeth of the surf fish are somewhat minute—which crushes the crustacean and mollusk as between minor millstones. The claw of a crab, possibly lost in fractricidal combat, is, when taken from the stomach of a large surf fish, observed to be traced with fractures. Byssuses of mollusks, the tough, thread-like filaments with which these bivalves tether themselves to the rock, are frequently found—and, of course, undigested—among the stomach contents. Since the adult mollusk is too difficult a viand for any surf fish, unless made available by some fortuitous preparation, it is probable that another and vastly stronger marine creature has crushed the shellfish and discarded that portion which came to the maw of the sea perch.

It is to be regretted that the Pacific surf fishes are commonly misnamed, by a christening which arises from the American tendency to call a newly experienced species after a familiar one. Some of the species are termed perch by those who take them, and this is sufficiently descriptive, though it were more desirable to term them surf fishes. Others are known by the wholly indefensible appellation of "bass," while the largest of the several species is styled the "pogy." By this same eccentricity of privilege our splendid American deer, the wapiti, is misnamed the "elk," and various distinctive animals—the bison among them—have sustained a similar confusion of identity in popular speech. The true pogy is, of course, the men-

haden, a fish that is allied to the shad; whereas the surf fish is comparable to the perches. But surf fishes are in other localities often called "porgy," and though this has a kindred sound to "pogy" it is in truth confusion twice confounded. For the porgy, in so far as American nomenclature is concerned, is a fish of the Atlantic coast only. The fishes of which this discussion treats are surf fishes, individual, unique, and deserving of something more than verbal borrowings. In time to come, perhaps, when men and children shall have fished them for a century or so, each species shall have its own name, descriptively apt. For names are given in that manner, and when they are so bestowed they are good names and true, as are the common names of flowers. To science the right of Latin identifications, but to the tongue of a people the privilege of christenings that are, and happily, less difficult to laymen.



"WHERE THEY INSPECT THE PILINGS FOR SUCH LUCKLESS FOOD AS MAY CHOOSE TENEMENT THEREON"

Concerning the Pacific surf fishes, Dr. David Starr Jordan recently said, in a letter to the author: "These little fishes are quite unlike any others. There are some sharks and some 'top minnows' which are viviparous, as well as the rock cod, the young of this latter fish being extremely small when born; but none of these have any connection with the surf fishes, which constitute an order quite by themselves." Unique creatures of the tide, forsooth. He who catches a fish holds mystery in his hands. Their ways, their habits, even of the better known species, are but imperfectly revealed to us, and some of them are secret as the dark and terrible gulfs in which they find a residence. But the surf fish is commonly a merry fellow, as of right he ought to be, with the bird rocks for his cupboard, the shifting beach sands for his fields of forage, and the desperate, brave surf for his home. Look away to the outer breakers. Our sea lion has returned, and the sunset strikes glints of evening's gold from his most sleek pate. Good fishing, sir!

OBSERVED

BY R. BRUCE HORSFALL

AND ILLUSTRATED BY HIM

WHILE watching some cardinals and pewees feeding behind Camp Roosevelt, the Boy Scout Camp on Chesapeake Bay, on a sunny August afternoon, I became aware of a ruby-throated hummingbird hovering about two feet above the feeding birds.

Every time a cardinal dropped to the ground upon a flying grasshopper and stopped to tear it apart, down would dart the hummer to watch the proceedings. Between times the hummer diligently searched out spiders for himself on a nearby Jersey pine.

Two weeks later I again noticed a hummer hovering over some feeding birds. This time I was at home in Washington, D. C., and the birds were English sparrows in the grass on the front lawn.

Neither time could I detect the least sound from the hummers, other than the whirr of wings; proof that they were not trying to annoy the feeding birds. Were they endeavoring to learn something about what the larger birds might be feeding upon? Both hummers appeared to be young males, whose debut was of the current year.

FLORENZ ZIEGFELD—NATURE LOVER

BY

ADOLPH L. FIERST

Another story in the series of Nature hobbies of eminent folks.

E. F. FOLEY

FLORENZ ZIEGFELD

The man who "glorified the American girl" seeks the out-of-doors and Nature for his good times

FLORENZ ZIEGFELD'S hundred acre estate at Hastings-on-Hudson is a Nature-lover's paradise. Strolling among the trees that face the broad river is like exploring a corner of Yellowstone Park. Brightly-colored birds by the hundreds hover around the branches; squirrels run along the boughs; little deer, not at all timid, will come up to lick the salt from your palm. And farther on, in a secluded spot, you may discover Patricia Ziegfeld playing with her bear cubs.

During the past few years the famous theatrical producer has displayed amazing variety in the hundred or more animals he maintains around his home. Not long ago he had two elephants and six chimpanzees—and a baby elephant that grew too large for his quarters. At the present time he has a collection of deer, five varieties of prize-winning dogs, a half dozen ponies and horses; bears, birds, monkeys, amphibians, fish—a bewildering miscellany of wild life.

On his Canadian retreat —Billie Burke Island, named for his famous wife, and situated in Lac Edouard, a hundred and twenty miles north of Quebec—he maintains a herd of bison, relics of the old West.

It was in the great West that young Florenz Ziegfeld, Jr.,—then seventeen or eighteen years old—first learned to love Nature. Forty years ago he was sent to a Wyoming cattle ranch to build up his health, and in those far, wind-swept spaces the future producer acquired a passion for outdoor life which has grown steadily stronger as the busy years have gone by.

DAUGHTER PATRICIA AND DEMPSEY

An inseparable pair during the past few years. Patricia has inherited her father's Nature hobbies

So powerful is Mr. Ziegfeld's love of wild life that he gives to it much of the time intended for his business. When he was returning to New York recently from Hollywood, he had his private car re-routed, and instead of proceeding east and home—where his presence was urgently required—he took two weeks to travel up the Pacific coast to Seattle and Vancouver, and then across Canada to Winnipeg, Lake Louise, Banff, and his own island. This trip was made with a threefold purpose: to satisfy his own love of the outdoors, to collect some more animals, and to show his daughter the scenic splendors of the great Northwest.

"I get a great thrill out of wild life," says Mr. Ziegfeld. "I suppose you would call it a 'kick'. It is my chief pleasure, and it never wearies me. I get more fun out of staying at home with my animals and birds than I do out of interviewing the most famous stars of the stage and screen."

Birds, indeed, are especially beloved by Mr. Ziegfeld. The vast sun-porch of his home is one immense aviary—a mass of color and song, filled with hundreds of red and green parrots, creamy cockatoos with purple crests, love-birds, parrakeets, golden and silver pheasants, canaries, finches. He breeds pheasants as he breeds his snowy, prize-winning chickens, watching over his pets with genuine devotion.

For this idyllic Nature retreat the setting is horticulturally perfect. Every available square yard of the extensive grounds is alive with scent and color. The

(Continued on page 195)

ANAEA PORTIA, A FLORIDA LEAF-WING

INTERESTING BUTTERFLY HAS PECULIAR HABITS NOT PREVIOUSLY DESCRIBED

BY J. H. MATTESON

PHOTOGRAPHS BY THE AUTHOR

THE leaf-wing *Anaea portia* gets its name from the leaf-like appearance of the underside of the wings and presents a striking example of protective coloration. The general color of this butterfly of the Nymphalidae family is burnt orange with a scarlet reflection on the upper wings and silver-gray on the under surface. It ranges into the Antilles and is one of the rarer species of southern Florida. Its life-history is of particular interest because, according to Dr. W. Schaus and Harold Morrison of the United States Department of Agriculture, it has not previously been described.

LEAF OR BUTTERFLY?
It is difficult to tell Anaea portia from the leaves of the croton on which it feeds

A female, even imprisoned with her favorite food plant, refuses to lay in captivity; so in order to watch the development of the young, I had to study more closely the habits of the female as she flew about the higher branches of dense tropical undergrowth. One afternoon I was rewarded. To my great joy, I saw a Portia depositing her eggs singly on the underside of the leaf of *Croton linearis,* a shrub common about Miami. The eggs resembled very closely small pearls, and were white-yellow, almost clear, spherical, about the size of a common pin-head.

If I was overjoyed about finding the eggs you will understand my delight in the hatching and emergence of a little, green, slightly hairy caterpillar, which quickly turned brown, covered with white papillae, eighty-seven hours later. How it grew! It changed its length from less than one-eighth of an inch to one and one-fourth inches in thirty-six days. Most caterpillars moult from three to seven times during their lives, leaving their skins for larger ones, but in this instance there was a difference. No moults took place, at least no cast-off skins were ever found, but during this period of growth the larva changed in color from brown to green and dropped the black bands which were present in the fifth and eleventh segments. Down the sides appeared the yellow stripe that marks the mature larva. Its head was larger than the second segment and was light green dotted with seven orange tubercles and one slightly larger black one situated near the apex.

During all hours of the day it eats the leaves of the croton, preferring one that is seeded to one that is flowering. In its earlier stages it eats only the outside of the leaf, leaving the midrib brown and exposed, but later it devours the entire leaf. It does not attempt to cover itself with leaves for protection as its color is protection enough, for the light green and sandy appearance is exactly that of the croton, and the dark brown is that of the stalk. The only enemies are birds which eat the larva and the ants which eat the egg.

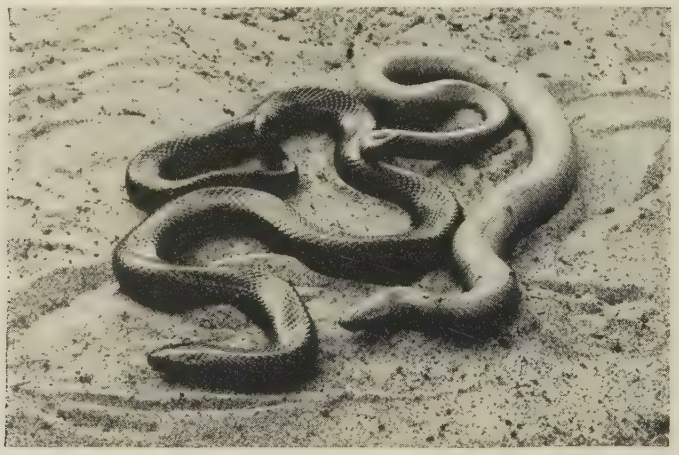
The movements of *Anaea portia* present a peculiarity. In commencing its tour it first moves its head from side to side, draws up the first six feet, moving these from one side to the other, releases the hind claspers and pushes the last pair of claspers to the position of those already clasping the stalk, but does not release them. Fastening claspers four firmly it moves claspers three to the ones just preceding and continues until all have been moved; but until the last forward is moved it does not replace the hind claspers. This presents an odd jerky movement which is intensely interesting.

SUSPENDED FROM ITS LEAF
The larva awaits the transformation, soon to take place. Note the leaf fastened crosswise

At the end of thirty-six days the larva, cylindrical and tapering, suspends itself by a button of silk. The old skin is cast aside, and in its place there appears a beautiful pea-

green, stout, thick chrysalis measuring five-eighths by three-eighths inches and resembling that of the monarch butterfly except that instead of the golden dots there is a yellow band. The scarlet of the future imago was apparent through the thin case nine days later. Early on the morning of the tenth day a beautiful Portia clasped the broken home, ready for flight, needing only a slight breath of air to cause it to soar away, a creature totally unlike the ugly caterpillar, or the hanging case. Just as Venus sprang from the foam, so unlike the waves that bore her, to be the "goddess of gardens and flowers, of the rose, the myrtle and the linden," so Portia emerges and flits away.

THE LARVA AND CHRYSALIS
Pictured during important hours in the butterfly's brief life



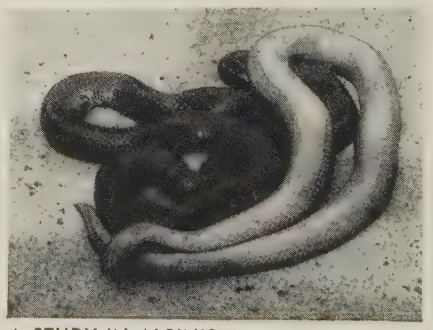
THE ALBINO AND HIS DARKER FELLOW
Horned snakes that dwell in Texas

A FREAK OF NATURE

AN ALBINO HORN SNAKE

BY J. M. HEISER, JR.

REPTILES, especially snakes, probably rank ahead of fishes as the subject of imaginative stories, and the so-called hoop snake or horn snake, *Farancia abacura,* is one of the most misrepresented of all reptiles. Current stories of its rolling like a hoop and of its venomous tail are of course untrue, but careful observers find the real horn snake fully as interesting as the fictitious one, for it is a creature of contradictions, an unsolved mystery to the student of evolution and adaptation.



A STUDY IN ALBINISM
The white horned snake is a rarity, though outside of color it is normal

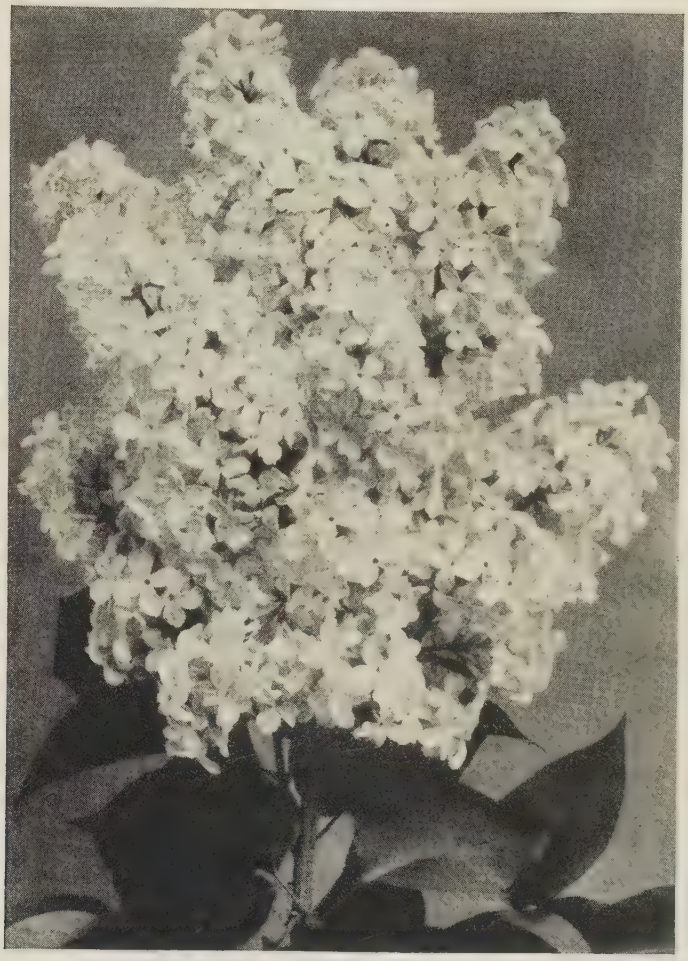
While found in miry swamps and ditches such as usually harbor the dull and ugly water snakes and moccasins, the horn snake is dark blue in color, varied by rich red blotches on the underside of its gleaming body which resembles a piece of china or polished metal fashioned in serpent form by some master craftsman. A small, blunt head, poor eyesight and other points indicate the horn snake's earth-bound, secretive character and the low forms of life upon which it feeds. It is rarely seen by the average busy man of today, but in places where it is fairly common, such as in the Gulf states, it is sometimes unearthed by the plow or dug up in excavations.

Why a snake of such lowly habits and habitat should possess a hard, horny tip on its tail and a strong, supple body like that of a kingsnake or other constrictor, that preys upon active, living creatures, is still a mystery to students of natural history.

An albino horn snake was captured in May by a farmer living about ten miles west of Houston, Texas. Astonished by the ghostly, wriggling shape, the like of which he had never seen or heard of before, he took it to some of his neighbors, and it ultimately reached the hands of members of the Outdoor Nature Club of Houston, who identified it and notified scientific authorities of the discovery. It is a true albino, with light pink eyes. Where there is dark blue and vivid red on the normal specimen, this one is waxy white and light pink. Its behavior is like that of the typical specimen, coiling tightly about the hand that holds it and using the sharp-pointed tail with usual ineffectiveness as a spur.

AMONG OUR GAY LILACS

BEAUTIES OF THE MODERN GARDEN



BY DOROTHY E. PLETCHER

PHOTOGRAPHS BY J. HORACE MCFARLAND COMPANY

LILAC TIME BRINGS THIS BEAUTY

Mont Blanc, a single bloom, but one of the most fragrant of the four hundred lilac varieties

"NEITHER the charm of Cleopatra nor the sweetness of Saint Francis nor the poetry of Racine will ever permit themselves to be reduced to formulae", wrote Anatole France. Strange that he did not include the winsome beauty and fragrance of the lilac, for this flower, more than any other, defies a cold analysis. The almost universal presence of the lilac in this country belies our claim to sophistication, for where there are lovely homes and gardens, there are sentimental people—and lilacs. And from the gigantic proportions of some of the bushes it is apparent that the lilac is no newcomer in America.

Its appeal, in some measure, may be attributed to its permanence—the fact that, once established, it faithfully supplies a wealth of bloom year after year for many years, requiring scarcely any attention. And if this pleased our industrious ancestors, what a joy it must be to rapid-moving "moderns" in nervous quest of something that will give the greatest amount of pleasure for the least amount of work?

Persia was the original home of the lilac, and from there, in the latter half of the sixteenth century, it was first taken to Vienna by a man named Busbecq, also famous for his introduction of the tulip into European gardens. In no time at all it had spread all over Europe, growing half wild in hedges. About 1640 it appeared in England, and from there, of course, found its way to America. Concerning the introduction of lilacs in this country, there is a story—debatable as to accuracy, but undeniably picturesque—to the effect that our first lilacs were brought to New England by a dashing youth, one Sir Harry Frankland, for Alice Surriage's garden. However chimerical the tale may be, it fits in admirably with the sentimental character of the lilac, and therefore, seems highly probable.

We know that George Washington, as preëminent in gardening as he was in statecraft, grew this fragrant shrub in his famous garden at Mount Vernon, because he wrote about it in his diary, that little book to which he confided so many of his horticultural secrets. But these old-fashioned lilacs of romantic Colonial days were simply members of the common lilac or *Syringa vulgaris* species, while the exquisite lilacs today—but wait. Herein lies the story of how our modern lilacs came to be.

WHERE LILAC SHOWS ITSELF IDEALLY

For hedges, or along drives, where its bloom contrasts with the dark of the conifers, lilac is superb. It should not be crushed in with its kind in masses

Over in Nancy, France, there lived a flower-loving man by the name of Victor Lemoine, a man who has done so much for gardens with his unusual blooms that he is universally called "the world's greatest hybridizer". One day there chanced into his hands a lilac of a double form which Libert-Daminot, a Belgian nurseryman, had produced in 1843. With his characteristic deep-seated curiosity about flowers, he took this lilac as a seed parent and, crossing it with the early-flowering *Syringa oblata,* produced those gorgeous lilacs known as Lemoine hybrids —those beauties which are now adorning our modern gardens. Although many claim for the Rouen lilac the distinction of being the very first hybrid since it appeared at the early date of 1810 in the Rouen Botanical Gardens, and was a cross between the common lilac and the Persian, the stunning Lemoine hybrids have the strongest hold on our affections. It is said that during the terrible Franco-Prussian War, when their home was in the midst of military operations, Lemoine and his family kept right on hybridizing lilacs in an attempt to forget some of the horrors of the conflict. Emile, his son, carried on the work after his father's death, and has made a name for himself, also, among the great in the annals of horticulture.

The Germans have also contributed some worthwhile hybrids. America's share in lilac hybridization is due, in part, to the work of the late Mr. John Dunbar, Superintendent of the Rochester Parks, whose extraordinary collection of lilacs in Highland Park attracts throngs of admiring people every year.

The Arnold Arboretum at Boston, in like manner, is the cynosure of all eyes at lilac time, for with its collection of over two hundred varieties it draws people like a magnet from all over New England. The late Mr. E. H. Wilson of the Arboretum, who imported many specimens of lilacs and introduced more than one lovely hybrid, was largely responsible for this unusual collection. His fame as a pioneer in establishing new flowers in this country has spread far and wide. Professor Charles Sargent, also of the Arboretum, has done much to further the popularity of the new kinds of lilac.

The most famous private collection is that of Colonel William R. Plum at Lombard, about twenty-five miles away from Chicago. His three hundred varieties are the result of fifty years of acquisition—a lifetime spent in

A CORNER OF GRANDMOTHER'S GARDEN

Here is the lilac of long ago, whose white or purple blossoms graced the springtime with rare fragrance. Even today, Syringa vulgaris is still popular

fanciful lilacdom! One can not imagine a lovelier experience. Those who think of the lilac as a back number in flowerland should take a trip to this delightful spot and get acquainted with these new sorts which differ so radically from the older kinds.

These exuberant new hybrids surpass grandmother's dooryard lilacs in many characteristics. Their wide range of color alone reveals their superiority. The flowers have been greatly increased in size—they are as much as three or four times larger than the old types—and by adding to their petals they have been doubled. Even the panicles of the individual flowers have been enlarged.

Our grandmothers' color plans for lilacs were obviously limited; white and lilac were the only colors available. Today there is every color imaginable. One finds it difficult to choose and reject—there are now over four hundred varieties. We may revel in countless shades of lilac, blue, pink, purple, violet. What an opportunity to have Utopian pastels in the garden!

The following suggestions concerning a selection of varieties is made with an eye to as long a blooming season as possible. We can have lilacs blooming for at least eight weeks. For the early bloomers we will plant two Chinese species which bloom about two weeks earlier than other lilacs—white flowered *S. affinis* and lilac-flowered *S. oblata*. Next in order comes still another Chinese species, *S. pubescens*, whose lavender flowers appear when the plant is quite young, thereby making it dear to the hearts of gardeners who want things to bloom quickly.

For the main season of blooming we might suggest single and double-flowered sorts from the different color groups. Should one care for white, there is the single-flowered Mont Blanc, or the double-flowered Mme. Casimir Périer; among the lilac colorings, try the single-flowered Charles X, or the double-flowered bluish lilac, President Grevy; from the pinks there stands out the single-flowered Lamartine and the double-flowered Belle de Nancy, while in the darkly colored or purple class the well-known Ludwig Spaeth with its blooms of crimson-purple and Congo, which wears one of the deepest lilac colors, are both charming.

For blooms after these hybrids have passed on, we turn to the Persian lilac with its rose-purple flowers; the Rouen

DEAR TO THE HEART OF GARDENERS WHO LOVE SPEED

A thick planting of Syringa pubescens, one of the early bloomers whose lavender flowers appear when the plant is quite young. Its home is in China

lilac with purple flowers of a red tinge; Lutece, an interesting new hybrid with violet-purple flowers. And for very late blooming one may rely on *S. josikaea,* the Hungarian purple lilac and the tree lilacs, of which *S. japonica,* a Japanese variety with creamy white flowers, is the latest of all.

As an obliging shrub for countless offices, our lilac, when all else fails, will rouse a garden from its lethargy. What a lovely welcome it has always made at the gates of Colonial homes—in fact, at the entrances of all manner of dwellings ever since very olden days. With its unusual vitality and verve for living and growing, there is no question of its fitness for hedges, foundation plantings, or screens for inartistic objects on the home grounds. It might be used as an eloquent background to set off the tulips and various other spring flowers. There is a naïve loveliness about bulbs coming up in the springtime beneath lilac bushes. Plant some and be convinced. And why not revive interest in that sentimental phase so persistent in old-fashioned gardens—the lilac walk?

As for the present vogue for massing—we ask that the lilac be not treated in this manner. One gardener has adeptly pleaded for the lilac to be given a chance to express its individuality. And how very right he is on this point. In massing together a large number of lilacs, we get only a crowded effect of struggling bushes—each trying to express itself, with the result that each stifles the other. Incidentally, they are thus cut off from sunshine and air, the two factors necessary to their well-being. Were they massed, the beauty of detail of their blooms, their subtle colorings, and the graceful outlines of individual bushes would be irrevocably lost in the resultant confusion. Far better would it be to concentrate on the lovely lilac walk where the charming lines of every bush could be displayed. But if the gardener has ample room around his home, and wishes to have his lilacs on a pretentious scale, he could plant them in fanciful groups of pink, blue, lavender or white; nevertheless, even in this, he ought not to approach the technique of massing.

Fall is the time when our thoughts turn to lilac planting. Space the plants from ten feet to twenty-five feet apart. See to it that the bushes are so placed that they will get plenty of fresh air and sunshine. Dig the holes for the plants deep enough and wide enough; spread the roots out well and then fill in with fertilizer and very rich loam. And at that, don't think your obligations toward your lilacs are over: water them generously and often during the scorching summer months. Later on they will show you how much they appreciate it.

Lilacs have a fondness for lime. They often display a very obvious resentment toward acid soil by refusing to bloom in it. Humor them then with lime. Place a bountiful supply of it at the base of each plant and work it in thoroughly.

The new hybrids, in their propensity for blooming early in life, put forth flowers when only a year old. Lilacs are grown from their own roots—merely the process of rooting a cutting until it is hardy enough to be transferred to the desired location. Because this procedure, in the case of the normal lilac, consumes about three years before a decent-sized plant is obtained, the practice of grafting or budding has been introduced. By this is meant that the variety one wishes to grow is grafted on a root of the common lilac, (Continued on page 194)

DELVER FOR DINOSAURS

CHARLES W. GILMORE, WHO KNOWS FOSSILS BY THEIR FIRST NAMES

BY ALMA CHESNUT

ONE summer day in 1880 a little country boy in blue denim overalls, properly escorted by his maiden aunt, stood wide-eyed before a group of stuffed animals in Ward's Natural Science Establishment at Rochester, New York. During the week that followed he haunted the buildings, marvelling at the collections on exhibit, but most of the time he was to be found in the taxidermy shop, lending rapt attention to the operations of men engaged in preparing specimens for display in museums.

"And that," says Charles Whitney Gilmore, the man who knows the dinosaurs by their impossible first names, "is where the museum bug got me. I was only six years old and I never recovered. When I returned home I immediately began collections of rocks, birds' eggs, stamps and fossil shells, but taxidermy had priority of interest over all of my private museum activities. I well remember a perfectly good cloth elephant, stuffed with bran, that was slit open, restuffed and sewed up time after time, until the poor thing lost all semblance of its original form. Many years intervened before the work was begun seriously but the idea of following museum work as a profession never deserted me."

It is due in a large measure to Mr. Gilmore's activities in the various posts he has occupied at the National Museum, in Washington, that people today can have a pretty good idea what the extinct and cumbersome animals of seven and eight million years ago looked like. From their fossilized bones, found widely scattered throughout the United States, he has pieced together giant skeletons of the grotesque reptilia that flourished in the Cretaceous Age, then mysteriously vanished from the face of the earth. Under his skilled fingers, from fragments like those of a huge jig-saw puzzle, have been reconstructed animals of nightmare proportions.

There is Brontosaurus, Mr. Gilmore's first real find, recovered in the Bad Lands of Wyoming during an expedition sponsored by the Carnegie Museum of Pittsburgh. Brontosaurus was a dinosaur sixty feet long, whose skeleton was found almost complete. There is Diplodocus, measuring eighty feet from nose to tail-tip; Triceratops, the three-horned dinosaur, with eight-foot

GOOD HUNTING IN BAD LANDS OF THE ROCKY WEST

The fossil finds are numerous in such country. Mr. Gilmore is shown in the center, and the dark objects lying near the wrapped bones are fossils as they appear au naturel

jaws and a six-foot bony frill at the back of his neck "like a fireman's helmet," the largest-headed animal the world has ever known. There is Trachodon, the duck-billed, with his two thousand teeth, and Stegosaurus, the armored dinosaur, that had two parallel rows of erect bony plates down his spine. The skeletons of all these monsters are to be seen at the museum and Mr. Gilmore, as Curator of Vertebrate Palaeontology, presides over them.

FOSSIL HUNTER
Charles W. Gilmore, who has devoted a lifetime to the bones of long ago

Mr. Gilmore will tell you that these huge creatures, standing from eight to fifteen feet tall in their stocking feet, were really not "quite bright". This conclusion he has reached by studying their brain cavities, which, in spite of the animals' great size, were very small. Stegosaurus, the smallest-headed of all, had a brain weighing two and a half ounces, though he was eight feet high in his middle, nearly fifteen feet long and weighed several tons. Triceratops, who might be expected to have been more intelligent since he had so huge a head, had a brain the size of a man's closed fist.

Though his knowledge of fossils extends over the wide field of the vertebrates, Mr. Gilmore's chief interest is in the scores of different dinosaurs. To him the unearthing of new information regarding the appearance and habits of this long-vanished race is as absorbing as unravelling the clues in a lively detective story. The methods he follows are often reminiscent of the exceedingly astute Sherlock Holmes.

Take Trachodon, for instance. His skeleton shows that his forelegs were much smaller than his hind legs and that in addition to his duck bill he had webbed feet. His teeth, though he had fifty rows, were flat. What, pray, would you make of that? Mr. Gilmore deduces that he walked on his hind legs, lived in swamps and marshes and fed upon rushes and other aquatic plants. In digging up Trachodon bones in Wyoming, a small piece of mummified skin was found. Aided by this bit of evidence and by his general knowledge of reptilian hides, he was able to visualize even more clearly the figure Trachodon cut in the old days.

Similarly it is known, from the character of their teeth, that some of the dinosaurs were carnivorous. It is suspected that they were even cannibalistic. Horns such as Triceratops wore hint at a belligerent disposition and Stegosaurus's heavy armor plate indicates that he had serious enemies. Indeed, Mr. Gilmore has found bones that had healed over after being badly fractured, and

DELVING FOR DINOSAUR BONES IN MONTANA
No work for weaklings, either. Note the impedimenta of the trade and the drill marks against the banks. The bones are wrapped in burlap dipped in plaster of Paris

other evidences of violent battles long ago.

Mr. Gilmore won his eminent place in the scientific roster largely through his own perseverance and effort. He was born in Pavilion, Genesee County, New York, March 11, 1874, the son of a farmer and one of three children. When he was eight years old his family moved to Michigan, settling in the little town of Howell, Livingstone County, and here he attended school. He was graduated in 1895 from the Howell High School, and the following year matriculated at the State University of Wyoming, in Laramie, determined to work his way through. This he had accomplished by 1901, by engaging in various jobs ranging from boarding-house work and service on the experiment farm, to collecting fossil specimens for the University in every possible corner.

TRICERATOPS? OR JUST BRONTOSAURUS?
In all events, mute relics of a mighty race that perished in forgotten aeons

An interlude in the business of winning an education was provided by the Spanish-American War. The young student thrilled to the call of the bugles and enlisted in the Second Regiment of Volunteer Cavalry, Torry's Rough Riders, but, much to his disgust, was not called to active service.

Fossil work for the University brought Mr. Gilmore, upon graduation, an appointment with the great Carnegie Museum of Pittsburgh. For nearly three years he remained with this organization, spending six months of each year in the fossil fields of Kansas and Wyoming, and devoting the winter months to the preparation of specimens for exhibition and to further scientific studies. The year 1903 marked his debut at the National Museum. His initial classification was "skilled laborer", but he was promoted steadily through the grades of preparator, custodian, assistant curator and associate curator until, in 1923, he won his appointment as Curator of the Division of Vertebrate Paleontology.

Mr. Gilmore's first piece of work for the National Museum was the preparation of a skull of one of the great horned dinosaurs, a delicate and intricate task that required seven months of steady labor. Later he mounted the large Triceratops skeleton now on exhibit and assisted in assembling other skeletons. Thus he helped build up one of the finest dinosaur collections in the country. His herd comprises some half a hundred specimens. In his spare time he has modeled in miniature a number of these reptiles, in an effort to show how they used to appear in real life.

WHY BAD LANDS ARE CALLED BAD
Because this gruesome creature, Triceratops, once dwelt there, as Dr. Gilmore's discoveries have proved. This interesting miniature was modelled by the paleontologist fifteen years ago

Although, in his present position, Mr. Gilmore devotes most of his time to scientific study and descriptions of extinct animals, he enjoys above all else the practical work of locating fossil bones and fitting them together. He has written one hundred technical and scientific papers, but in spite of his auctorial duties still finds time to potter about the museum workshop. Here you will find him often, puzzling over some huge fragment, or lending valuable aid to preparators engaged in assembling a prehistoric giant.

Mr. Gilmore's expeditions have led him into Wyoming, Montana, Colorado, New Mexico, Arizona, Texas, Utah, Virginia and Alaska, and his camps have been pitched in their most desolate sections. Fossils are more easily located in so-called "Bad Lands", scanty of vegetation, the scientist explains. Along cliffs and ridges carved by flood and erosion, upon plains raked by winds, the presence of valuable finds is often indicated by bones protruding from the earth, or lying upon the surface. The age of the geological formations is recognized by definite characters, and where the rocks indicate treasures of the Cretaceous or Pleistocene Ages here the shovels sink.

On May 22, 1907, Mr. Gilmore shipped from Seattle for Alaska, taking with him a canoe, pickaxes, shovels and provisions. Accompanied by a single companion, he was off on an assignment to explore the territory in the direction of the Nowitna River, called the Bone Yard region because of its reputation for fossil deposits, and the areas on both sides of the Yukon as far as Andreafski. Fort Yukon, a desolate outpost beyond the Arctic Circle, was reached June 23 and Rampart, the limit of steamboat travel, on June 24. The midnight sun was shining. The scientist took photographs from aboard deck and prepared for his long trek by canoe. During two months spent on the Yukon and its tributaries he traveled by canoe for nearly 1,400 miles, the severest part of the journey being up the Nowitna River for 200 miles. Not a settler was seen during this part of the trip and, due to numerous sand-bars, it was frequently necessary to leave the canoe to track and wade across them. The sand-bars, however, proved a valuable source of fossils, though no complete skeletons were found. Relics were found also along the Yukon Palisades. These included fragmentary remains of the mammoth, horse, elk and bison. The Alaskan expedition was ended September 29 and Mr. Gilmore cherishes vivid memories of his experiences in the Arctic.

As a result of his own work and of his studies of fossils found by others, Mr. Gilmore possesses a fund of knowledge rare in interest. He will tell you, if you can persuade him to talk, of chalk beds in western Kansas, where giant fish, aquatic turtles and lizards long extinct swam, in Cretaceous times, in a vast inland sea; of a mecca of horned dinosaurs in the Lance Creek region of Wyoming, where forty skulls of Triceratops were found. According to the story of the rocks, Wyoming was tropical country in those days, a land of swamps and shifting waterways, of giant ferns and palms. Mr. Gilmore will tell of fossil crocodiles, or animals that resembled both the alligator and crocodile, from the region of the Cheyenne River, where they flourished in abundance.

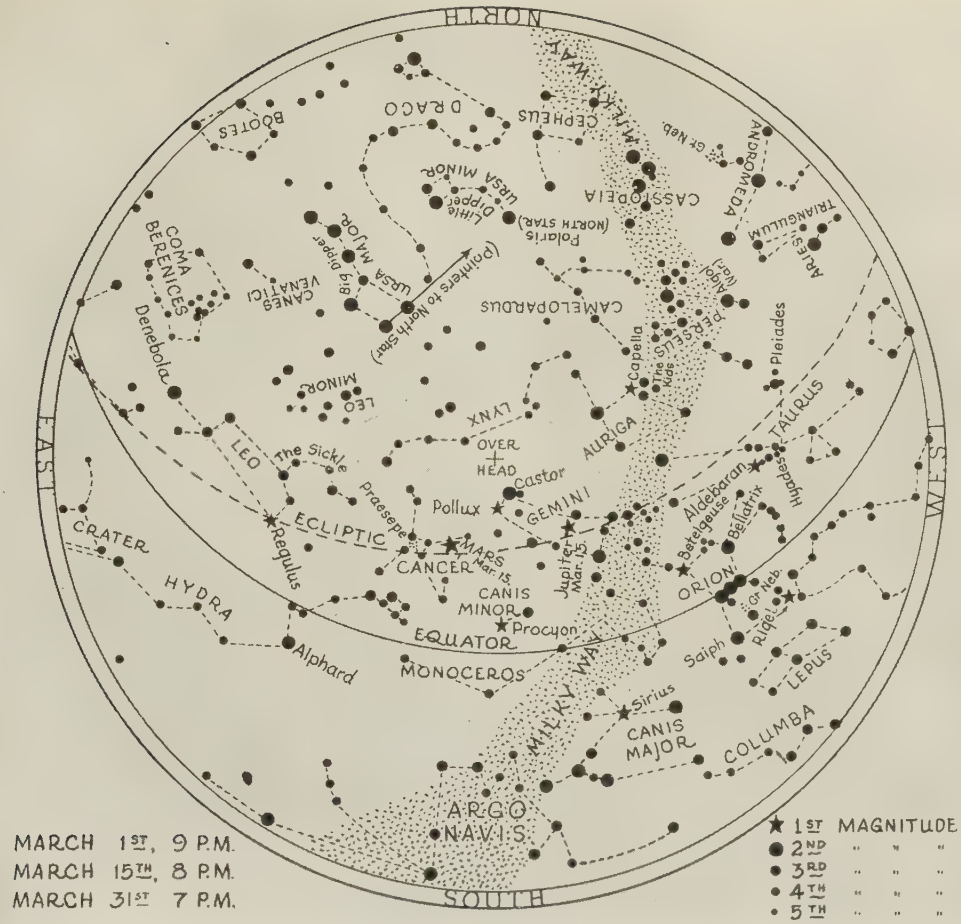
One of his most interesting tasks was to superintend the transplanting of five thousand nine hundred pounds of fossil footprints from the Grand Canyon to the National Museum, where they are now on display. Hinting at mysteries aeons old, the imprints of strange animal feet were found several years ago from nine hundred to 1,080 feet below the level of the present canyon rim. Their great antiquity was indicated by the fact that more than a thousand feet of rock, not including the hundreds of feet that have been eroded away from the present top of the canyon wall, had been piled up since the animals first walked across the moist sand.

In addition to the stone slabs that were dug up and brought back to the museum, several hundred square feet of stone bearing the imprints were cleaned off and preserved *in situ* near the Hermit Trail for the edification of visitors. This constituted a Herculean task since the footprints led up a steep incline and, in order to make them accessible, it was necessary to construct a rough stairway out of the stone. Palaeontologists are still puzzling over the story half-revealed by these ancient animal footprints, for all, except those of one large animal, pointed up-hill and whether they led to some ancient water hole or mark the course of a great animal migration is a point that has never been settled.

A word, in conclusion, about the scientist himself. If, because he spends so much of his time in an atmosphere of forgotten ages, you have pictured him as a rather dull sort of fellow, banish all such thoughts from mind immediately. He is a young man in his fifties. He was married in 1902 to Laura Coutant of Cheyenne, Wyoming, a daughter of Colonel C. G. Coutant, at that time State Librarian of Wyoming. They have two charming daughters, who keep him young. Should you meet him on the green—and you are very likely to meet him there, for he is an ardent golfer—you might take him for anything but the stereotyped scientist.

He has a keen sense of humor and is always an entertaining conversationalist. He is so very afraid of boring people with scientific discourse, however, that, unless you corner him and insist upon it, he will talk fluently upon anything under the sun—except fossils, and himself.

Readers will recall last year two delightful stories from the pen of E. Chesley Allen. He returns to our pages with the leading article in April. Other articles next month include one on the microscope, an excellent home aquarium story, an excellent article on garden lilies and other features we would rather have one wait and find.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

THE INCONSTANT MOON

A FEW SIMPLE FACTS YOU MAY OR MAY NOT KNOW

BY ISABEL M. LEWIS

THE moon is our nearest celestial neighbor but there are some facts of an extremely simple nature concerning its appearance, motion and influence upon the earth that are not very widely known.

One of the most obvious and yet, surprisingly enough, one of the most difficult facts for adults and children to understand is the cause of the phases of the moon. Possibly this is because so many do not grasp the fact that a non-luminous body in the heavens, such as a planet or the moon, shines only on the side of its surface that is turned toward the sun. Consider the moon when it is at the phase of new moon. It then lies between us and the sun, not necessarily in a line with earth and sun (or there would be an eclipse of the sun) but a little above or below the line connecting the two bodies. At that time, of course, the illuminated side of the moon is turned toward the sun and away from the earth. It is the dark, night side of the moon that is toward us at this time and consequently we do not usually see it at all. Twice a year, however, when the moon is at its node, or at the point where it crosses the ecliptic or plane of the earth's orbit, it does pass directly between earth and sun, causing an eclipse of the sun. At this time the moon can be seen as a dark body against the brilliant background of the sun in those tiny corners of the earth from which the eclipse is visible.

Most people apply the term new moon to the moon when it appears as a thin crescent in the western sky at

sunset. It is really about twenty-four hours past the position of new moon at that time. The crescent represents the small part of the illuminated or day side of the moon that we can see when the moon is in this position in its orbit. At this time also the night side of the moon appears faintly luminous, because it reflects the reflection of the sun's light cast on the earth. If at this time we were on the night side of the moon we would see our own planet brilliantly illuminated and nearly full under the direct rays of the sun and we would be flooded with earthshine just as, at the time of full moon, the night side of the earth is flooded with moonlight. As the earth is sixteen times greater in area than the moon, earthshine is far more brilliant than moonlight, and is strong enough to be reflected on the face of the satellite. When it floods the moon, it causes the phenomenon often spoken of as "the old moon in the young moon's arms."

Let us now follow the moon in its revolution around the earth and consider the phases corresponding to its different positions in its orbit. About a week after the new moon, the moon has completed one quarter of a revolution around the earth, and is said to be at its "first" quarter. The total trip requires twenty-nine and a half days from new moon to new moon. The waxing crescent has changed to a half-moon—that is, half of the day side and half of the night side of the moon can now be seen from the earth. After the moon passes this point of its orbit and until it reaches the position of full moon, nearly fifteen days after new moon, it is spoken of as gibbous, for more than half of the side turned toward the earth is illuminated. The dark portion decreases in area continously as the illuminated side comes more and more into view until at the time of full moon the entire side of the moon that is turned toward the earth is illuminated. It is at this phase that the moon may pass into the shadow of the earth partly or entirely and be partly or totally eclipsed. This can occur only when the satellite is near the point where its orbit crosses the ecliptic or plane of the earth's orbit, that is, when it is near one of its "nodes," as these crossing points are called. These eclipses of the moon may occur two weeks before or after the dates when eclipses of the sun take place. Every year there are two periods separated by six month intervals known as eclipse seasons when eclipses of sun and moon may occur. Every year there must be at least two eclipses and there may be as many as seven. As the nodes are not stationary points but regress, the dates of the eclipse seasons vary year by year.

Shortly after the new moon, as we have said, the moon appears as a thin crescent in the west after sunset, setting soon after the sun. When at the first quarter, it is on the meridian due south at sunset and sets at midnight. It is from first quarter to and including full moon that the moon is seen to the best advantage in the early evening hours. If you wish to plan a moonlight entertainment or moonlight sports pick out a time just before rather than after the full moon, for the moon rises on the average an hour later every night. On the night of a full moon the moon rises at sunset and sets at sunrise and is visible all night; but the very next night it will not rise until about an hour after sunset unless it is near the time of the Harvest or Hunter's moons, at which periods it will rise at nearly the same time on several successive nights. The cause of this phenomena lies in the fact that the ecliptic, at that time of year, September or October, makes a small angle with the horizon and the time of rising is least retarded on successive evenings. When at the last quarter, when the gibbous moon has again changed to half-moon and again half of the day side and half of the night side of the moon are visible from the earth, the moon does not rise until midnight and is on the meridian at sunrise. From then on until the time of the new moon, it is again in crescent phase and rises later and later each night until a day or so before new moon it is last seen as a thin crescent in the east before sunrise.

Much is heard about the influence of the moon over the affairs of men, the weather and the crops. There are not the slightest scientific grounds, however, for any such belief. The only effect that the moon has upon the earth is due to the mutual gravitational attraction of the two bodies—the tides. They vary directly as the mass of the attracting body and inversely as the cube of its distance. The sun as well as the moon raises tides upon the earth. The sun is nearly twenty-seven million times more massive than the moon but it is nearly four hundred times farther away and the cube of this difference is about sixty-four million. Thus it can be seen that the moon, because of its nearness, has a more powerful gravitational effect than the sun. Actually the tide-raising force of the sun is about five-elevenths of that of the moon.

In winter, as many know, the full moon "rides high" in the heavens and in summer the full moon is at a low altitude. This is most noticeable in polar regions where in winter the full moon reigns for twenty-four hours, with the sun below the horizon, and where six months later it lies below the horizon and is invisible. This is due to the fact that the moon when full passes over the same path that was followed by the sun six months before, because it is always directly opposite to the sun at the phase of full moon. In winter, in polar regions, there are, of course, days when the sun never rises and in summer days when it never sets.

There is but one lunar "sign" in which we have any faith and that one admits of a definite scientific explanation—the ring around the moon which is visible a day, or possibly two or more, preceding a storm. This is an almost infallible sign of approaching bad weather because it is produced by diffraction of the light from the moon by the gathering vapors, which necessarily precede a storm. You will recall in *The Wreck of The Hesperus* that the old sailor predicted the storm because

"Last night the moon had a golden ring,
Tonight no moon we see!"

That failing of artists of painting the moon in impossible positions seems to be less common now than it was a few years ago. Artists seem to know more astronomy than formerly for now it is rare to see a crescent moon pictured high in the mid- (Continued on page 196)

JASPER National Park

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mid the towering peaks of the Canadian Rockies

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The New **EMPIRE BUILDER**

GREAT NORTHERN

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Edited by
ELEANOR WALKER

If there is one word that seems synonymous with sunny skies and deep blue water, it is "Mediterranean," and although the steamship and guide companies cannot guarantee the weather, the percentage of lovely days seems to be in their favor. They can, however, promise us a swift kaleidoscope of strange peoples and places.

There's Gibraltar, of course, with the English sitting on top of the rock, so to speak, and pretty much all the world besides mixing together in the town below. Moors, with their inevitable red fezzes, jostle dark-skinned Hindus. The loquacious Spaniard is there to sell you anything and everything. But the real cock of the walk is the English "Bobbie."

Spain, after that—another magic word, suggesting to some of us these gorgeously colorful murals of Spanish town, country and sea-coast life that line the walls of the Hispanic Museum at 157th Street and Broadway, New York; or, in another mood, those mystic greens and grays, purples and blacks of the Toledo anchorite, El Greco; or, in less pensive humor, the virile and vigorous earthliness of Goya. Spain, it is true, is becoming modernized so far as industry and agriculture are concerned, but the costumes and customs, the scenery and the architecture still retain their colorfulness. In Granada, probably included on your tour, you can at last wander in that famous palace of the Moors, the Alhambra. The trip from the coast inland to Granada is a bit more interesting by auto than by rail, for after driving through miles of orange and lemon groves, you finally pass by a deep gorge through the high Sierra Nevada, so that you see the mountain from afar and near. Coming back from Granada, the roads skirt the Mediterranean, and if you know of anything grander than skirting the Mediterranean,—you will.

Algiers flashes across one's mind, brilliant purples, greens, whites, in glaring sunlight. Is any man as picturesque as an Algerian? His dark skin with high coppery sheen contrasts vividly against white turban and white robe over red or purple tunic. Nominally Algiers is French. There are French busses, French cafés, French quarters, and even French statues; but actually Algiers is Arabian with its veiled women, men's coffee houses, its shrill pipes and drums. If you wish to see the country behind Algiers with the quiet Arabian villages, the Atlas mountains, and tropical vegetation, you can easily include it in one day. Coming back, you'll have grand views of the Mediterranean to the North.

One scarcely knows why it is that of all the places in the world, islands seem the most enchanting, and Sicily is one of these spots that seduce us to linger. The air is soft, the meadows are lavishly flowered, the

GOING ABROAD?

How much does it cost?
What hotel do you suggest?
Will you plan my tour?
Can I send my luggage?
Is my money safe?
about Pullman seats?
Can I go by plane?
Brene

EN WHY SHOP AROUND FOR YOUR STEAMSHIP RESERVATIONS

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NORTHERN PACIFIC
139
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sheep graze leisurely up the hillside. At Taormina especially, with its excellent sight of the snow-clad Etna above and the shimmering blue sea below, we long to stay on and on. But there are sights to be seen and we go to see them. The cathedral at Palermo, the Cathedral of Monreale, and all the fifty-seven varieties that Sicily's rulers have built here, Roman, Byzantine, French, Arabian and Norman. One of the oddities of the place is the plumed donkey with his cart elaborately painted with Biblical or other legends.

Greece cannot be taken with a rush or enjoyed on the run. There is no country in the world probably that asks of us so careful a preparation for an appreciation of her beauties, and after weeks of study, to have the words, "the classic quality of Greece," change from a mere phrase into an actual understanding is an experience in itself. Then only do the poise, the restraint, the perfection and simplicity of Greek sculpture and architecture take on significance. Then are we ready for the Parthenon and its frieze, the theatre at Epidaurus and the Lion's Gate at Mycenae.

If you continue into the Black Sea from the Mediterranean, not only will you be able to see the Russian Riviera and those stimulating cities, Sebastopol and Odessa, but you will also get a glimpse of the Crimea, one of Russia's loveliest spots with its high mountains and deep valleys. Changes have come. Many palaces are now Workers' Vacation Homes, many of the streets are named for Soviet heroes, and Karl Marx now stands on a pedestal from which Catherine the Great used to survey her realm.

Constantinople means Santa Sophia. Long ago a poet wrote, "Who shall describe the fields of marble—of the church—fresh green from Carystus, many-colored Phrygian stone of rose and white, or deep red and silver." But it's the dome, hung as though in air, that leaves us breathless. After Santa Sophia, there is the Great Bazaar where Turks, Tartars and Moors are seen against the seemingly jewelled background of gorgeous rugs, silks, daggers and armor.

Constantinople is the Arabian Nights come true. But Naples is something far more delicate and eerie—a fairyland done in soft pastel colors. The town itself is noisy and one might almost say coarse. But it is of the harbor, the Amalfi Drive, Sorrento and the country all around that we speak. Vesuvius slumbers. All is serene beauty.

We end the trip along the French Riviera, with another chance to drive along the Mediterranean—truly a gift from the gods.

Water Chestnuts

A hint to the youngsters and oldsters of the District of Columbia is contained in a letter received from Cyril H. Powles of Takata, Echigo, Japan, commenting on our recent water chestnut article. In Japan the chestnuts are sold in the market and are a frequent table dish. Mr. Powles says that they taste just like boiled corn on the cob and make fine eating. He suggests that the solution of the problem of the choking of the Potomac River by the spread of this imported water plant may lie in the popularization of these nuts as food.

In Yosemite—Giant Trees, Mountains, Waterfalls

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Lazy morning hours in Wessex, the Kingdom of the West Saxons, visiting Weymouth's Pennsylvania Castle connected with the early Penns. Or grim old Corfe Castle still locked in the important past where the boy king Richard II was murdered. The grey bones of Netley Abbey are the ruins of paradise, according to Walpole.

Go over to the New Forest if you are engrossed by the memories of the Norman Williams. Wimborne Minster still chains its library. Stand beneath the riddle of Stonehenge. When it was built men lived who had seen Israel's flight from Egypt. Canterbury, the city of Augustine, and leafy Tunbridge Wells. Goodwood and Ascot, where the equine aristocrats reign supreme. At the great Torchlight Tattoo at Aldershot the flower of the British Army reenacts the epics of history.

Great bastions still guard the angles of Arundel and gallant figures loom out of the mist of centuries gone by.

Illustrated Guide No. 9 will be gladly mailed if you write to

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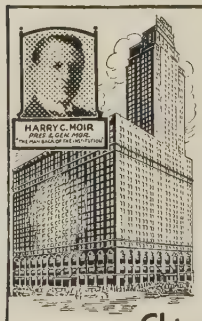
Re Inquiries

Editors in America will sympathize with A. E. Hodges, editor of the *Aquarist*, an English publication devoted to aquaria, in his Christmas editorial against careless inquiries. Many readers, he says, send in requests for general information of such nature as "Please tell me how to breed goldfish and how to construct a pond for the purpose,"—requests which, if fully answered, would compel the editor to set aside his duties and prepare a book. Mr. Hodges' grievance is one in common with the entire editorial fraternity. Nature Magazine receives hundreds of letters in the course of a year asking obviously the impossible. Not long ago, a writer asked: "Please give me all information on the birds of North America." Another inquired: "Please tell us about our National Parks." Editors appreciate the flattery to their mental equipment much more than they do the demands upon their time. They are always glad to answer particularized inquiries, however, and will go to great lengths to give complete information. Another difficult type of question to cope with is exemplified by the following: "I saw in some magazine about four months ago a short note on the biography of a Nature writer. Will you please give me the substance of the article, if it appeared in your magazine?" Mr. Hodges is not alone in his heartfelt and courteous request to readers to be as definite and particular in their inquiries as they would wish the editors to be in their answers.



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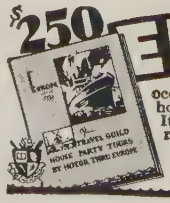

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See Story on
Page 157 of This Issue

Helps and Hints
FOR HOME AND GARDEN

ANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

VERY gardener agrees with the novelist, and as spring is ushered across the eshold we heartily welcome her. Even ough she be a fickle maiden, we know t in a few weeks she will settle down l with gentle caresses woo our gardens k to colorful loveliness. Even now, ex- t in the North, early flowers are burst- forth, and before many weeks the spring w will be on in earnest.

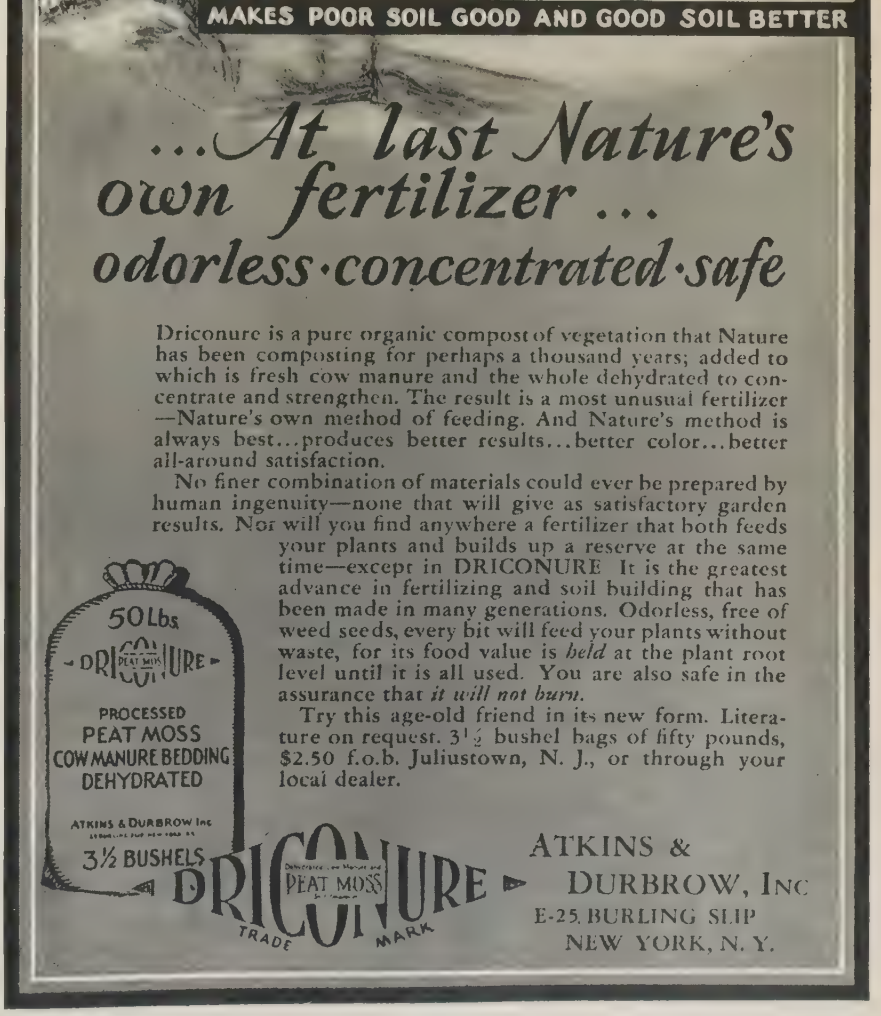
The beauty of your garden in the spring pends upon the thought given it last r. The early flowering bulbs and per- ials planted last summer and fall will ard you now, but if you slipped up on job then, you should now make stronger blations for next year. The spring season uld find your garden aglow with nar- s and gay with bright tulips. Dainty wdrops, crocuses and scillas should peer from beneath the bare branches of lbs and trees as well as from many other es. Flower borders, so filled with gen- us masses of color later in the season, uld now shelter liberal plantings of early omers. It seems the early flowers are bly welcome because the hold of winter o lately broken.

This is not the season for planting the ay showy spring flowers, but rather you uld carefully make a list of them as they ssom forth. Make weekly visits to dif- nt gardens, to local nurseries and bulb ms as well as noting the dwellers of the ds as they put in an appearance. Keep n records as will enable you to plant r in accordance with the habits and ural needs of the various species. Note color, height, preference for sun or de, soil requirements of the wildlings any other information that might prove thwhile. Many of these early blooming ies can be inter-planted in close prox- y to varieties that bloom later and each make their season gay with color.

s the season advances and outdoor work be done, you will find innumerable s awaiting your attention. Not only t the annual seeds and plants be looked r but shrubs and trees that are to be ed this spring demand early planting. ny shrubs and trees start growth quite y and all planting should be done before begin to put forth leaves. In order that' may be possible, nurserymen dig their ks in the fall and heel them in over the ter in frostproof storage cellars where may be held dormant until late in the g. This method makes possible the se and planting of shrubs and trees fter they would normally be in full

re is one serious disadvantage to g dormant stock at this season and

If you would have a garden fair prepare your SOIL
All garden soils—even those that look dark and rich—need an additional supply of humus every year, to maintain correct soil texture. The proportion of humus in soil controls the amount of life-giving and beauty-giving food and moisture plants will be able to get. The better the soil texture, the more luxurious will be the foliage and bloom.
The safest, surest and least expensive humus is GPM Peat Moss. Like billions of tiny sponges—it is guaranteed to absorb and retain more moisture, and contribute more humus, over a longer period of time than any other commonly used medium. It helps plants breathe, controls temperature, and increases fertility by creating that "fine" yet absorbent condition which best promotes root development. But be sure to specify GPM.
Sandy and clayey soils require proportionately more humus than garden loam—but your garden, every garden needs the addition of this vital element this spring. Let us send you complete information and prices.
PEAT MOSS
MAKES POOR SOIL GOOD AND GOOD SOIL BETTER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Driconure is a pure organic compost of vegetation that Nature has been composting for perhaps a thousand years; added to which is fresh cow manure and the whole dehydrated to concentrate and strengthen. The result is a most unusual fertilizer—Nature's own method of feeding. And Nature's method is always best...produces better results...better color...better all-around satisfaction.
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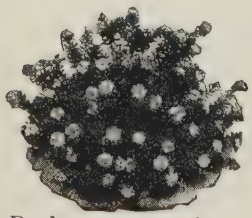

The dainty Garland flower is an evergreen growing about one foot high and as much broad.

Daphne cneorum is covered with pink blooms in May, which continue sparsely through the summer; in September there is another profusion of blossom. The fragrance is delightful and the plant may be used as a single specimen, or as a flowering border to edge a walk or flower bed. It is absolutely hardy and remains green all winter.

We offer 8- to 10-inch plants, with ball of earth, packed for expressing, **5 for $6.50.** In quantity of 50 plants or more at the rate of **$95 per hundred.**

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that is the natural habit of such plants to make root growth during the early weeks before top growth starts. Fall planting takes this into consideration and except in sections of extreme winters is greatly to be preferred. Spring planting will be successful, however, if you will prepare the ground thoroughly, making it very fine and, most important of all, prune back the top growth at least a third. It seems difficult to get the average amateur to prune newly planted material sufficiently. If they could only realize that it is the very best thing for the plant because it balances up the loss of feeding rootlets, which necessarily attends transplanting, they would not hesitate to prune. All over the country every spring, one sees shrub plantings that are struggling to make growth when, if properly cut back, they would soon be well established.

Early spring is an ideal time to transplant and divide many perennials, especially the summer and fall blooming varieties. There are some exceptions, notably peonies, which should never be planted or disturbed in the spring. Delphinium, gaillardia, funkia, helenium, fall asters, chrysanthemums and many others may be taken up with little harm to the plants. Hardy phlox can be divided late in the fall or early in the spring, the former probably being the better season. As most perennials are rank feeders, they require dividing, transplanting and enrichment of the soil every few years. No small part of the success with hardy borders depends upon transplanting at regular intervals.

Hardy chrysanthemums play an important part in numerous perennial borders, while many other gardeners fail with them simply because they do not divide the old plants regularly. All "mums" should either be divided to single shoots every spring or new plants started from cuttings. The roots produce a host of young plants around the old crowns, but, if not divided annually, the blooms will become small and the clumps crowded. Cuttings about five or six inches long, made in the spring when new growth is about that height, will root promptly in moist sand and every one will make an ideal plant by fall, producing bloom of the best quality.

Many lilies may be planted in spring, including *Lilium regale, auratum, elegans, henryi, japonicum, speciosum, sulphureum* and *tigrinum*. Most of these are easily propagated by seeds or from scales. A half dozen or more of the scales may be removed from each bulb without injury to it and these scales may be planted flat, about two inches deep, where within three or four months each scale will have produced one to three little bulblets. Many lilies may also be grown from seed which can be purchased from numerous dealers. Most lily seeds grow easily if planted about an inch deep in well drained beds of light, sandy soil. By either of the above methods you may secure a stock of bulbs at small cost, and you stand a better chance of their being free of disease than when purchased from possibly questionable sources.

Early spring, just as your lawn starts active growth, is a good time to apply a top dressing to it. Few lawns are planted in soils sufficiently supplied with humus and this deficiency may be gradually supplied by annual or semi-annual top dressing. An ideal dressing is made of two parts

Don't Allow insect pests to destroy the hard work of long months. Protect your plants, shrubbery and flowers by the use of Wilson's O. K. Plant Spray.

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6 GORGEOUS EVERBLOOMING ROSES for $5.00 *Postpaid*

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good light loam and one part peat moss, or for lawns built upon clay soil, equal parts of loam, sharp sand and peat moss. To each cubic yard of the above mixture add twelve pounds of ammonium sulphate, twenty-five pounds of bone meal and fifty pounds of cotton-seed meal. Mix thoroughly and pass through half-inch mesh screen. Each cubic yard will topdress about four thousand square feet. A similar application can be applied in the fall. Rake in well and water thoroughly if rain is lacking. Top dressing of this kind, applied annually or semi-annually for several years, will aid materially in developing a better lawn.

Don't be in too great a hurry to remove the winter covering from perennial borders. When the bulbs begin to appear it is generally early enough to start, and the mulch should come off a little at a time. Fleshy-leaved plants need airing earlier than others, but until there is no danger of serious frost injury the covering should not be removed entirely. If you did not remove all dead foliage and stalks last fall, it should be carefully done when they are uncovered, for many disease spores are carried over upon them. When all covering is removed and the garden thoroughly cleaned of all dead tops, it will pay to start spraying phlox, delphinium, hollyhocks and similar things. Use bordeaux and spray the crowns, new growth and soil around them, saturating it thoroughly. This will destroy many disease spores at the start and eliminate much future trouble.

In cleaning up the yard and garden, do not remove the mulch from around rhododendron, laurel, azalea and other acid-loving plants. Leave it there and as it rots down keep adding more year after year. Around all kinds of shrubs, it is better to work a large part of the decaying leaves into the soil rather than rake them away in the spring. It is not Nature's way to clean everything up as we see so many home owners doing at this season. Entirely too much humus is wasted that should remain to enrich the soil. Fork or cultivate it into the ground around the shrubs, trees and hedges.

How many bird houses have you around your yard? One or two are not enough. I had six in a garden some years ago in a space only fifty by one hundred and thirty-five. Every bird house will pay for itself a hundred times over as the birds devour the hordes of insects which otherwise might defoliate our plants. Put out bird houses at once that they may weather somewhat before our feathered friends arrive. Properly made houses, well placed where enemies of the birds cannot reach them, will prove attractive to many species. Every yard should also contain a bird bath, but this is not needed as early as are the houses.

With the spring garden rush just around the corner, it behooves each of us to get busy as soon as possible. Many tasks may be gotten out of the way during the next few weeks and these will leave us free to attend the more insistent duties later. Efficiency in gardening is as important as in other walks of life and the ultimate satisfaction derived from this hobby depends largely upon it. Plan ahead, anticipate the needs of your garden and you will not be overwhelmed when the season is fully arrived. Nature Magazine's advertising columns contain many suggestions for the gardener, and include the best dealers.

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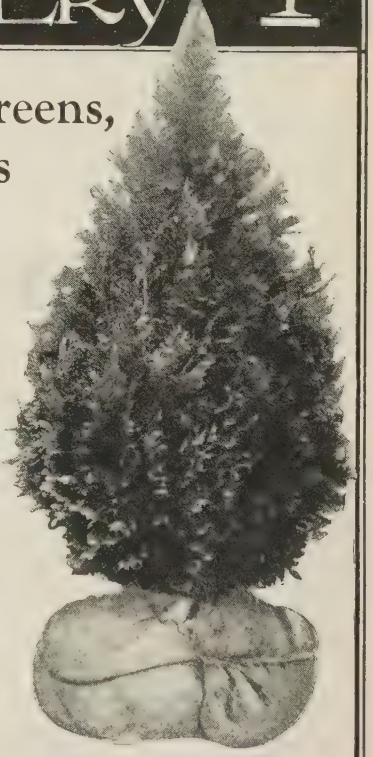

Hybrid Rhododendron Balled for Shipping

Above—Lawson Cypress Balled for Shipping

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Instead of sowing seed, you plant stolons or the chopped grass—and in a few weeks you have a luxuriant lawn like the deep green pile of a Turkish carpet. Read all about this unusual grass in our illustrated booklet "Bent Lawns." Mailed on request.

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Shell Pink Radiance—Silvery.
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Gruss an Teplitz—Scarlet.
Columbia—Mammoth rose pink.

36 big plump bulbs, 2¼ to 5½-in. circumference GUARANTEED to bloom this year. Big blooms—all colors and types—includes dark garnet NEOGA, ruffled salmon pink MRS. FRANK PENDLETON, dainty DORRITT, glowing MRS. KEUR, rare orchid and pastel shades. 36 for $1 postpaid.

GIVEN WHILE THEY LAST
36 additional big bulbs, large-flowering glads with each order glads and roses totaling $2.95.

ACT NOW Supply of these 2-yr.-old FIELD-GROWN bushes is limited. From either group, you can pick long-stemmed fragrant roses this summer and fall and for years to come. Either group, A or B, costs only $1.95 delivered as soon as planting season opens. West of Mississippi River, add 20c per group.

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Originated and patent applied for by Three Springs Fisheries, Frederick, Maryland.

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Box 382
Denver, Colorado

AMONG OUR GAY LILACS

(Continued from page 178)

or on privet stock. Many horticulturists claim, however, that this grafting method is unsatisfactory, and that lilac cuttings of their own roots are the only dependable type to plant. It is rather a question—one for each gardener to settle to his own satisfaction by experimentation.

There is still another way to acquire new plants and that is by planting suckers from the parent plant. Ordinarily it takes about three years to get a bush to bloom from this method, and if the grower has patience, he will find that ultimately his bushes raised from suckers will be better than those from cuttings.

As for the art of pruning, first of all remember that one should never cut back in the winter because the lilac flowers are on the wood of the preceding season's growth. Immediately after the blooming season, then, is the time to remove all the flower clusters and extraneous suckers which are unnecessary to the structure of the bush.

Although the lilac is very healthy normally, it has been attacked recently by the lilac borer in the vicinity of Washington, D. C. In discussing a method for eliminating this nuisance, Agriculture Department scientists say: "Infested portions of bushes should be removed and burned during the late fall and in the winter and early spring. The caterpillars can be cut out individually or they may be killed by running a flexible wire into their burrows or by injecting carbon disulphid therein. When carbon disulphid is used, the openings of the burrows should be closed tightly for several days with some gas-proof material such as grafting wax. Afterward the wounds should be opened, cleaned and thickly coated with a waterproof preservative such as good lead paint."

It is unnecessary to proffer arguments for growing this gorgeous shrub of trailing sweetness. The lilac speaks for itself. At present the demand for fine lilac cuttings far exceeds the supply and undoubtedly will continue to increase. And that is not difficult to understand, for discerning people everywhere realize that these beautiful new hybrids are a notable contribution to flowerdom.

Holden Arboretum

A 100-acre tract of land near Kirtland, Ohio, has been presented to the Cleveland Museum of Natural History for development and to be known as the Holden Arboretum. The tract is the gift of Mr. and Mrs. Benjamin Patterson Bole and Benjamin Patterson Bole, Jr., and will ultimately be maintained by a large trust fund established by Albert F. Holden prior to his death in May, 1913. The announcement was made by Harold T. Clark, the secretary, before 450 members of the museum who had gathered at the University Club to celebrate the tenth anniversary of its establishment. Lewis Blair Williams, the president, accepted the gift. The Holden Arboretum will be stocked with the finest specimens of trees, shrubs and flowering plants, all of which will be the source for new plantings for parks of the city and Metropolitan Park District. Mrs. Bole is a daughter of Liberty E. Holden, founder of the *Plain Dealer*. Mr. Bole is president of the Plain Dealer Publishing Co.

Rock Garden Plants

Many of Nature's loveliest little plants are found in Rock Gardens. Building the garden and selecting the plants is a fascinating task, if you make

Our Catalogue of Alpine Plants

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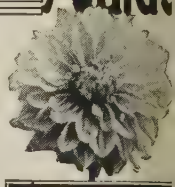
The most helpful catalog. Spend a postal right now to prove it. Complete facts are given; faults and good points of each variety are set down without bias.



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Size 9 x 12 and bound in each catalog. Never before published. 16 columns are devoted to 87 best Dahlias, giving: Creator and Introducer, Year, Trial Ground Rating, Roll of Honor, Color, Height of Bush, Size of Bloom, Cutting Length and Price. You'll use and prize this catalog and chart. It gives good reasons why "Willow" is a safe place to buy *absolutely guaranteed* Dahlias. Here are six reliable roots—good as you can get. Order today.

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FLORENZ ZIEGFELD—NATURE LOVER

(Continued from page 172)

producer's favorite flower is the tuberose. Whenever he returns from a trip—as, for example, from his sojourn in Hollywood, where he supervised the screening of some of his stage successes—his offices in the Ziegfeld Theatre Building in New York are filled with its sweet, penetrating scent. Mr. Ziegfeld loves this odor. He says it gives him energy to carry him through the heavy schedules of his business days.

At the present time he and his daughter have a new passion—frogs! They have raised large numbers of the big green leapers, and now every lily pad in the various ponds of the estate has its quota of croaking, pop-eyed amphibians.

Little Patricia Ziegfeld has been a lover of animals ever since she could walk; and today Miss Patricia, at fourteen, is even more ardent than her father in her devotion to their pets.

Mr. Ziegfeld *preserves* wild life; he does not destroy it. This very successful man, unlike other successful men, gets more fun out of playing with wild animals, watching them, and breeding them, than he does out of killing them.

In the midst of his flowers, his birds, his animals, one of America's busiest men relaxes; and in the living heart of his Nature paradise he throws off the myriad cares of his hours of work.

A Patented Water Lily

The *Mrs. C. W. Thomas*, a new water lily of beauty and fragrance, may be the first of the water lilies to be patented in the United States, if the plans of the Three Springs Fisheries and Aquatic Gardens, Frederick, Maryland, are successful. This plant, dedicated to the mother of the owner of the firm, is described by Dr. Ball, formerly of the U. S. Department of Agriculture, as " a large flowered, free-blooming, long season, day-flowering water lily with floating, very fragrant, partly double flowers of a shell pink color, with thirty-six petals. It exhibits certain characteristics of the Odorata and Tuberosa varieties." Only one root of the *Mrs. C. W. Thomas* is in existence, and the owners are carefully propagating it to supply the demand for this new creation. The patent will be granted, it is expected, in the spring.

A Rich Find

Imagine going out for an aimless stroll and returning with eleven pounds of food! Such was the experience of a lucky soul near Fort Wayne, Indiana, according to Miss Mary E. Erwin of Bloomington. On a ramble he found a huge puffball, one of the edible mushrooms, and brought it home to serve later thirty-five lawyers of the LL. B. club wisely and well. The ball, when discovered in a field, was white and dazzling in appearance, and its soft flesh was perfect. Somewhat later, if it had not served as well to bolster the law, it would have become brownish-black and eventually burst to send millions of spores out into the wind.

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Special Offer—For 50c in stamps we will send a large packet of Harris New Supreme Hardy Lupins, containing a large proportion of the rare shades, all colors mixed. And also

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In this Book, sent without charge, even advanced amateurs will find valuable hints on Garden planning and the control of garden pests. We are large growers of Vegetable and Flower Seeds, Bulbs and Plants. Our 108 page Catalog in color gives you just the information you want about each variety and offers the opportunity of buying Harris northern grown seeds direct from our farms at growers' prices. Ask for the Catalog today, it's Free.

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Kalmias or Mountain Laurel

Selected clumps 1½ to 3 feet high, 600 to the carload for **$450.00 f.o.b. Virginia.**

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Carload of 500 clumps, 2 to 3 feet high, **$450.00 f.o.b. Virginia.**

These prices stand for very highest quality *collected stock*. Orders for less than carload lots cannot be accepted at these exceptional rates, but we will mix carloads for those wanting part Kalmias and part Rhododendrons.

Special Nursery-grown Specimen Stock as well

For those interested in lesser quantities of Kalmias, Rhododendrons, Azaleas, etc., we grow one of the choicest and greatest collections of all the worth-while hardy native shrubs right here at Southwick. If you are among those who believe in the naturalistic type of gardening we will gladly mail you our

Unique Catalog on Request

It abounds with offers of plant materials not generally found in nursery catalogs. Ferns, hardy Orchids, Lilies and other wild flowers are our specialty. Let's get acquainted by writing for this profusely illustrated book today, mentioning this publication.

GILLETT'S

FERN AND FLOWER FARM

7 MAIN STREET

SOUTHWICK MASS.

THE INCONSTANT MOON

(Continued from page 184)

night sky or with its horns drooping downward toward the horizon. It is apparently more widely known now than in the past that the illuminated side of the moon is always necessarily turned toward the sun whether the sun is above or below our horizon. Poets and writers, in general, are also more careful than in the past in referring to the phases of the moon and to its position in the heavens at such phases. No longer do we read of a moon crescent at one hour of the night and full at another or of a full moon appearing in the west in the early evening or of a star within the horns of the crescent moon. What is now most needed is freedom from ideas that the moon has any influence over our fortunes, our health or our dispositions, our weather or our crops.

Two planets are visible for the greater part of the night this month, namely Mars in Cancer and Jupiter in Gemini. Mercury may be seen the last day or so of the month low in the west at sunset. Mars is still equal to a star of first magnitude in brightness. On the fifteenth it lies a few degrees southeast of the first magnitude star Pollux in Gemini and nearly overhead. Jupiter is the most brilliant stellar object in view now, even surpassing Sirius in brightness. It lies southwest of Castor and Pollux and forms a nearly equal-sided triangle with Procyon, the Little Dog-star, and Betelgeuze in Orion. Venus and Saturn are now morning stars. Venus is in Capricornus on the fifteenth and Saturn in Sagittarius.

Spring begins this month on the twenty-first at 9:07 A. M., Eastern Standard Time, when the sun crosses the equator coming north. Day and night will then be equal in length all over the world.

Orion and Taurus are still in fine position for observation in the western sky. Sirius is in the southwest and Procyon nearly due south at 9 P. M. March 1. Castor and Pollux in Gemini lie nearly due north. Leo is high in the east and the Big Dipper is now northeast of Procyon.

Bearing on Traps

If you want to catch a bear, don't set a mouse trap. That is the advice Yellowstone rangers give to the world, after their recent experience in trying to protect their emergency fire rations at the Lake Ranger Station. The pantry was being constantly raided, and in desperation, the rangers set eight mouse-traps to capture the invaders. The second night, the station chief was suddenly awakened by a trap snapping shut. This sound was followed by a sharp "flu-u-u", as if a locomotive was letting off steam in the tiny commissary. A second trap snapped, then a third and a fourth, and after the sound of each the peculiar gasp was repeated. The ranger investigated with a flashlight in his hand and curiosity mingled with fear in his heart. As the light swept the pantry, it revealed, on the floor, vainly trying to shake off four mouse-traps from his fur, a huge black bear. No report is given, but we assume that the chief then went up to the bear, removed the traps in the fashion of Androcles pulling the thorn from the lion's foot, and let the oversized marauder go his way.

Protect your Garden
Those tiny green, red or black insects which feed upon the tender green foliage or the buds of your flowers and plants are aphis (plant lice). You must kill them and similar insects if you expect the best growth.
Used By Gardeners Over 20 Years
A garden size "Black Leaf 40" package costs only 35c and makes about six gallons of effective spray. Have it on hand and be ready for insect attack. Sold by dealers in several sizes.
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Send for either of these offers and we will mail you a copy of our 1931 Catalog beautifully illustrated in color, which describes a number of new California-grown specialties and a coupon good for 25 cents credit on any $2 purchase from the Catalog.

FRASER'S new Rainbow Asters are an improved strain (originated in California) of the well known single aster. Their delicate beauty defies description. The flowers, much larger than the ordinary single aster, come in colors quite different from those of most flowers. To acquaint you with Fraser's seeds, we will send you our regular 50c packet postpaid for 25c.

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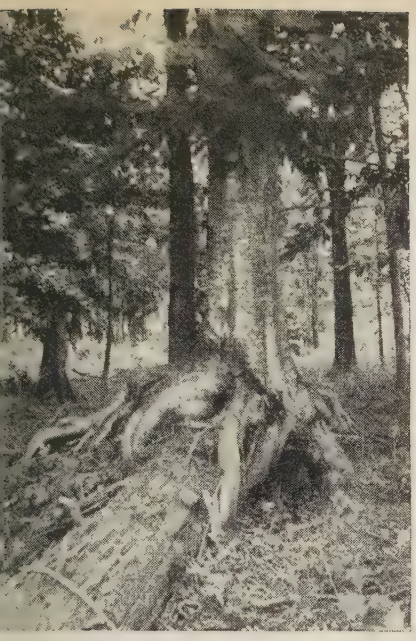

How It Happened

"How did the birch tree start growing?" sks Joe Drueke of Grand Rapids, Michi- an, who sent in the above photograph rith an explanation, printed on page 261 f October Nature Magazine, of the phe- nomenon of a tree growing with roots sev- ral feet above the ground. The birch has vidently wrapped its roots around an old caying log. D. C. Weller of Waynes- boro, Pennsylvania, and E. M. Dahlberg, ecretary of the Wisconsin Conservation ommission, Ladysmith, Wisconsin, both tisfactorily solve the second problem. The rch seed, they believe, dropped on the rooted tree lying on the ground, germi- ated, and sent its rootlets down either side the log into the soil. Mr. Dahlberg irites: "In my nursery business I frequently llect two- and three-year-old seedlings om my woodlot. Most of these I simply ull out of old stumps and logs. These ecies will grow in moist moss and decay- g wood for two or three years and if e roots do not come into more desirable bstance in that time they will simply die." r. Weller compares the phenomenon to at of trees growing on rocks: "In the cky lands of the mountains, there are fre- ently seen trees growing on bare rocks here there was a slight amount of leaf old, and sending their crown rootlets down side the rocks."

Setter Adopts Lion Cubs

Trilby, the now famous, or infamous, n mother who refuses to care for her ung, has again given officials at the ational Zoological Park something to think out. How to bring up her neglected lit- rs? When cubs arrived in June, Mrs. illiam M. Mann, wife of the Director of Park, bravely stepped up to accept one them, Susan, to bring up in her apart- ent, and her experiences were described the January Nature Magazine. Again in ecember, the lioness presented the Zoo th three youngsters, and blandly ignored em, while foster mothers were sought. A ter dog who had lost her family was essed into service, and at last reports was rsing and caring for her strange brood th an equanimity born probably of igno- ce of the fierce flock she had taken un- er wing, if you'll pardon the metaphor.

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TEXAS CONSERVATION

By Bessie M. Reid

Just a few years ago Texas antelopes were nearing the vanishing point. This year the state's conservation department will report that the "pronghorns", guarded in an ancient Culberson-Hudspeth Counties' stamping ground of theirs, are satisfactorily increasing. Game wardens expect to bring the herd, now numbering about six hundred, back to approximately its full strength of bygone days. Its sanctuary lies among the same Guadalupe Mountains in whose New Mexico upper tip is situated Carlsbad Cavern. This has long been known as one of the natural last stands of both antelopes and bighorn sheep. A few of the sheep yet share the crags and narrow ledges, hidden upland valleys and deep bosky gorges of their retreat with bears, wolves, deer and still abundant lesser fry.

The Guadalupe Range is one of the most extensive of numerous spurs of the Rocky Mountain system that, between them, cross western Texas. Also one of its several very lofty summits is the highest point in Texas. This is Guadalupe Peak, over 9,000 feet in altitude, and, because of the sheerness of its final rise, appearing much higher than it actually is. Timber covers a good part of the mountain tops, and follows the cañons down to the plateaus. There growths hardly expected east of the Pacific Coast, or anything like so far below Canada, mingle sociably with legitimate representatives of their families, also with luxuriant thickets of cactus and other arid land vegetation, as well as with plants strayed northward from the tropics, or near these.

At the Kerrville fish hatchery, "Heart o' the Hills", another Texas game commission project is being successfully carried out. In the section of the reserve allotted to him, a special "nurse" is daily confronted with a problem that might well have stumped Solomon himself.

Thirty-odd fawns are the charges he is raising by hand. At feeding time they crowd around him like so many puppies or kittens. His supply of milk bottles will be practically emptied; but every pair of softly pleading great eyes, every little velvety nose sniffing eagerly at friendly hands, will continue to declare more could be held by small tummies already visibly full rounded. The expertness with which the provider of substitutes for maternal care picks out the really hungry amounts to pure genius; where groups of the little dappled beauties are, as regards size and general appearance identical to the gaze of visitors.

Hollow Trees

Hollow trees, the harborers of many types of wild life, should be saved, writes Martin K. Nelson, Minnesotan game warden, in a recent issue of *Fins, Feathers and Furs,* the organ of the Minnesota Izaak Walton League. These decaying forest dwellers play an important part in Nature ecology, as well as supplying a Nature lover with an unlimited field for investigation. In such trees one finds the home of the crested fly catcher and of the woodduck, Warden Nelson continues. They are the police station of the woodpeckers, where they busily work to keep down insect life. They furnish natural background for the bluebird, an

oth the mischievous red squirrel and his ıore sedate gray cousin love to use them ɔr houses. Raccoons thrive and multiply ıpidly even in thickly settled sections ·here hollow trees are common. Among the ·ds, the sparrow hawk, screech owl and ·rred owl find refuge in decayed trunks, ıd the bees select similar spots for their ɔney deposits. Two types of vandals at-·ck hollow trees, Mr. Martin concludes— ıe bee hunter and the raccoon hunter, and ɔth are upsetting Nature's scheme when ıey burn or chop them down to get their ıarry: "Such persons are not considerate f the welfare of many things in Nature ·hich directly benefit them. They too often ·erlook the fact that a little selfish gain ·day may mean a great loss to themselves ıd others tomorrow. This selfish trait is ıund in many persons who seek the out-ɔors for pleasure and profit."

Bear Tragedy

Horrified visitors to Yellowstone Canyon ·st summer saw a little black bear struggle ɔot by foot up the cliff next to Yellow-ɔne Falls, reach a point even with the top the falls, and then go hurtling down-·ards over the rocks into the river, as a ·ck came loose. The bear had somehow ·imbed down into the canyon on the west ·de close to the lower falls, but was unable get back to the top of the canyon wall ·d safety. For four days he wandered about ·inly seeking a safe exit from his foodless ·ison; he kept away from the bottom of ·e canyon which offered a way out, evi-·ntly frightened by the noise of the falls. ·nally he decided to gamble against death a climb a mountain goat might shy at, ·t was beaten by forces greater than he ·uld withstand. But the hundreds who saw ·m swept to his death took away with them ·new understanding of the courage and ·ength of his kind.

Mastodon Bones

Who wants to buy mastodon bones? . L. Smith, a farmer dwelling near Hud-·n, Ohio, on whose property a considerable ·rtion of the remains of one of these pre-·storic monsters was found last year, has ·e set for sale. Mr. Smith was digging a ·ch to drain his land when he struck one the teeth of the animal, and later dug four more teeth, several pieces of dis-·tegrated cheek bone, a cervical vertebra ·d the ends of both tusks. Several other ·gments were found by an excavating ·rty carried on under the supervision of . J. E. Hyde, curator of geology at the ·veland Museum of Natural History, but ·pe of bringing to earth the entire skele-· has been given up. Mr. Smith is still ·gging, according to Fred Glenny of Hud-·n, who reports the find, but scientists ·clare that his chances of success are slight.

Forest Trails

Nearly eight thousand miles of new ·ghways, forest development roads and ·ils were built in the National Forests ·ri g the last fiscal year, it is announced the United States Forest Service. This ·rk makes available more and more of the ·a of the National Forests for recreational ·rposes.

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Record Elk Antlers

A pair of gigantic antlers, which, with skull attached, were picked up near the Lake Fish Hatchery in Yellowstone National Park, compare favorably with the record heads previously found, according to the Yellowstone National Park Nature Notes. The Yellowstone set averaged 57½ inches in length, with a spread of 48½ inches, and weighed, dried, 38 pounds. The circumference at the base was 11¾ inches. There were six points on each antler. The seven point pair in the National Collection at the New York Zoological Society measures fifty-eight inches in length, with a circumference at the base of ten inches. The record head listed by Jonas Brothers had antlers sixty-six inches long, with sixty-inch spread and six points on each antler. The average elk in Yellowstone carries less than four feet of capital appendage which weighs only about fourteen pounds.

Coyote vs. Cat

There's a coyote in the confines of Jasper National Park, Canada, that has his own ideas about house cats. He recently tried to steal a piece of fish from "Trollop", who attends to odds and ends of culinary importance about the Jasper Park Inn. To the visitors he might have been a strong and lusty coyote, but to Trollop he was only a mangy dog, and she made for him as he crept close to the brook trout on which she was feasting. And before the fur had settled on her back, the animal from the wild was going places rapidly with a bleeding nose and torn ear. Then Trollop, who remembered the day was Friday, went back to her fish, still sputtering over the intrusion. And the obvious question in the coyote's mind is: who said tame tabbies weren't wild?

Hanged for Murder

The onetime pleasant habit of hanging animals for their crimes was recently recalled by *Animal Life,* the Nature magazine of Canada, in its description of a trial of a sow in France in 1457. The sow was convicted of "murder flagrantly committed on the person of Jehan Martin, aged five". The sow's six sucklings were prosecuted as accomplices, but earned an acquittal from lack of evidence against them and were released on bail. The mother, however, was sentenced to be hanged by the hind feet from a tree or gibbet. Occasionally, clemency was shown by the ancient court. In a later case, in 1750, a she-ass which had been condemned to death was pardoned because of her former good behavior.

State Parks Popular

State parks were used by many more people in 1930 than in previous years, according to figures available from several states. A new record of 13,000,000 was established in Palisades Interstate Park in New York and New Jersey. In Connecticut a 20 per cent gain was registered, and Michigan hung up a record of 8,891,000, 19 per cent more than in 1929. The American people seem to be rapidly discovering the values of state parks and taking advantage of the recreational possibilities they offer.

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Story Of Seasons

Delightfully written by Helen von Koltz Hyer, formerly Curator of Public Instruction in the Charleston, South Carolina, Museum, and illustrated by R. Bruce Horsfall, staff artist of Nature Magazine, *Stories by Seasons* is one of the most attractive books for juveniles issued in 1930. It covers many phases of Nature in interesting narrative fashion—the wonderful milkweed Monarch butterfly has a chapter to itself, migrating birds fill another, a third describes the return of the coyote to its former home in northern Michigan and Wisconsin, and a fourth deals with sprouting time. Black bass, rabbits, snakes, pirate wasps, and hawks are some of the subjects on which the twenty-two chapters are devoted. One error occurs in the book—a photograph of a red-tailed hawk bears the unfortunate caption, "Small Birds Fear Red-tail, the Hawk". Actually, the red-tailed hawk seldom molests our small birds. This is the second book issued by Mrs. Hyer. *In Shiny Wings*, a previously-issued volume for younger children, dealing with wild life about Mrs. Hyer's South Carolina home, was also illustrated by Mr. Horsfall. The books are published by J. Marshall Jones Company at 22 Summer Street in Boston. *Stories by Seasons* is priced at $1.75.

Much Ado About Roses

The "Queen of Flowers", the rose, has at last been included in the series of Home Garden Handbooks, Frederick F. Rockwell is writing for the Macmillan Publishing Company. Mr. Rockwell divides his roses into three classes—climbers, garden roses, and landscape roses—and gives complete directions for their care and cultivation, together with many suggestions for their effective use about the home. The effectiveness of Mr. Rockwell's writings is too widely known to be retold here; there is surely a garden lover's home that does not have one or two volumes in his library. The book is priced at $1.

Uncle Sam's Merits

How to use the Department of Agriculture, whom many consider to be the real "Uncle Sam", so helpful is it, is told in a new booklet published by the department as Miscellaneous Publication 88—MP. "Uncle" has many activities, and he knows the ways of aiding Nature lovers, farmers, trappers and many other different types of people. M. S. Eisenhower, director of information and his assistant, A. P. Chew, have prepared the booklet in the belief that many individuals, by a perusal of it, will find that they, too, have a problem "Uncle" can solve for them. The booklet is priced at $.25.

Growers of Cacti

For the rapidly multiplying army of cactus growers, a book. Arthur D. Houghton, President of the Cactus and Succulent Society of America, has prepared *The Cactus Book* to keep amateurs who bring desert scenery to duplex apartments informed. Mr. Houghton's little work includes: the botany of cacti; their care, preparation, and use in rock gardens and out-doors as well as in-door amid miniature landscapes; a tabulated list of all cactus species and varieties; and an interesting chapter on acquiring and trading cacti. Priced at $2.25 by Macmillan.

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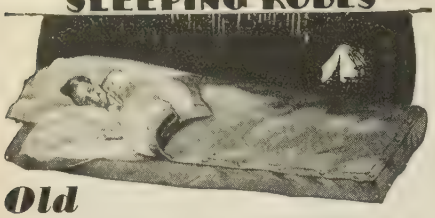

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SUMAC-ADE

By Salome Comstock Miller

Are you thirsty? Then step up with me to yonder stag-horn sumac, and we will milk off the bright red berries, and prepare ourselves a drink that few drug-stores can duplicate, and to which pink tea and circus lemonade must pay homage. A luscious drink, a beautiful rose color, a rare *vin rouge* which Nature has hung promiscuously throughout her woods.

Many fear to gather sumac seeds, knowing the evil powers of the poison sumac, its prodigal relation. But the staghorn has velvety-hairy fruits, leaf stems and young branches, and the leaflets are sometimes thirty-one to the leaf. The fruit is bright, bright red, and appears on the tips of the branches, rather than along the side. It stands erect in a stiff compact panicle, in contrast to the dull-colored, drooping berries of the harmful variety.

Just add the juice of these staghorn berries as you would lemon juice, and fill the canteen with the bubbling ice-cold water of that nearby spring. You can walk for hours under the hottest summer sun, and still be refreshed with a single long drink of the pale rose liquid. But you must pick the sumac berries when they are ripe—they must not be immature, or too dry for use. Only for several weeks are they suitable, but this period seems to come during the hottest weather.

Staghorn sumac is an object of beauty, even when one is not thirsty and hot. Springtime brings beautiful drooping leaves upon which summer places the red velvet seed clusters, and autumn adds red and yellows to this chameleon tree. Even in winter, the stiff, bare branches with the bright fruits topping them are dignified, striking in appearance. Sometimes the tree reaches upward forty feet, but usually it is about ten feet tall. A most desirable member of the plant world, and like so many other members of the animal world, much maligned because of the deeds of its scapegrace relatives.

Town Levies No Taxes

Nothing is certain, the prophet said, but death and taxes, but the parish of Orsa, in the province of Dalecarlia, often called "the heart of Sweden", has found a way to avoid the second fixture. It owns extensive and valuable forests, the yield from which is enough to cover all community expenses. In fact, this year's budget showed a surplus of profits over expenses of 115,665 crowns, or about $30,438. American communities with a desire to lower the grumbling at payment time might try the same method.

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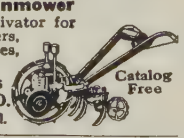

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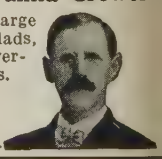

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An extremely interesting group of ice formations was found recently by Paul A. Schaefer of Schenectady, N. Y., who was exploring the Indian Ladder trails in the Helderberg Range, New York. This group was discovered in Copperhead Cave, a very picturesque dome-shaped hollow lying deep in the maze of cliffs which rim the easterly side of these limestone hills.

The constant dripping of water from the forty foot dome to the floor of the cave caused about two dozen ice "stalagmites" to form. They varied in height from but a few inches to seven feet and averaged between two to three inches in diameter, with the largest about five inches in thickness. The extreme tops of the smaller ones were rounded, while those of the larger deposits were perfectly flat. The bottom diameter in most cases was considerably smaller than the top. So elastic were these formations that the top would bend several inches without breaking.

The cause of their irregular formation seems to lie in the fact that the temperature had bobbed about considerably in this section just before their discovery. During the previous week the weather was very mild. The day they were found it was more than twenty degrees below zero on the mountain summit, and the following week it was sufficiently warm to entirely melt the group.

Just how long it took for these stalagmites to form is not known. Six weeks previous to their discovery, Mr. Schaefer, in visiting the cave, saw no evidence whatever of ice formations. At the time the photograph was taken there was a lapse of a quarter to a half minute between the single drops of water building them.

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(Continued from page 151)

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In handling any of these animals, care should be taken not to frighten them or hurt them. Never pick up a rabbit by its ears! Pick him up by the loose skin on the back of his neck, putting your other hand under his body to support the weight. That is the way his mother carried him when he was a baby and is more comfortable for large rabbits than the usual method. As a matter of fact, this is true of most mammals, small enough to be carried.

To the person who attempts for the first time to rear one of these rodents will be given an interesting experience and some different ideas concerning this much maligned family. As is often true when one rears a helpless creature, familiarity, instead of breeding contempt, engenders respect and real liking.

Butterfly Migration

One pleasant afternoon in September, Clyde R. Seebach of Sherrodsville, Ohio, witnessed with a friend one of the most curious migrations on record. Both men were basking in the sunshine high above Stoney Lake when they were disturbed by a low humming noise. A large swarm of gnats was hovering over the bushes of an adjoining lot, and the men attributed the noise to them, until the distant squawks of a great blue heron roused them to look overhead. There were thousands of dragonflies in the air, and with them, as far as the eye could reach, could be seen great clouds of monarch butterflies. The two men watched for over an hour while the countless numbers passed in their air parade. They seemed to be drifting along with the winds from a distant storm approaching from the north. As there was no possibility of the dragon-flies being hatched in the lake, Mr. Seebach is interested in discovering further facts on the migration. Any other person witnessing the cloud of insect life is asked to communicate with Nature Magazine.

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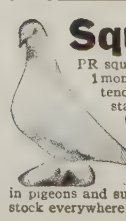

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E. C. Hoffman of Lakewood, Ohio, sends us this fine picture of a wild screech owl banded October 20, 1930, at Lakewood. If this fellow is found or comes to an unfortunate end, the number on the band and place of finding should be reported to the United States Biological Survey. The photograph is by Mr. Hoffman and loaned by courtesy of Bird Banding Magazine.

Pigeon-Hawk Race

After reading an article on hawks in Nature Magazine, G. A. Karlson of Spokane, Washington, recalled a race he had witnessed a quarter of a century ago between a pigeon and a hawk and reported it as of interest to Nature Magazine readers. The pigeon was flying away from Mr. Karlson's home when noticed, with a hawk in full pursuit. Just as the larger bird was about to swoop on its prey, the pigeon made a *volte face,* turning toward a barn that was several hundred yards distant. The hawk overshot the quicker bird, but managed to turn and take up the pursuit once more. Just as it was again in striking position, the pigeon reached the barn, darted in through the open doors, and sought safety in the cupola. The hawk, fearing human-built structures, shrieked its rage and winged rapidly away. The pigeon had reached safety just in time.

Heron Not Guilty

The great blue heron and other fish-eating birds have been given a clean bill of health by the Biological Survey, which has definitely proved that the birds get only a small proportion of game or commercial fishes, and prey on the enemies of spawn to a sufficient extent to make them more beneficial than harmful. Examination of stomachs of birds indicate that yellow perch, catfish, suckers, minnows, sticklebacks and like kinds of fish are taken more frequently than trout or other game fishes. The birds eat also dragon-fly larvae, predacious diving beetles and other types of insects harmful to young fry. The great blue heron is destructive about fish hatcheries, but under natural conditions prefers to feed on the slower fish, easier to catch, which frequent the shallower portions of the streams, and because of its habits is more beneficial than harmful to the sportsman and the commercial fisherman.

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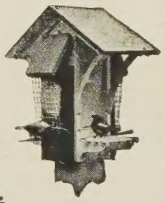

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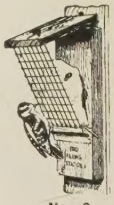

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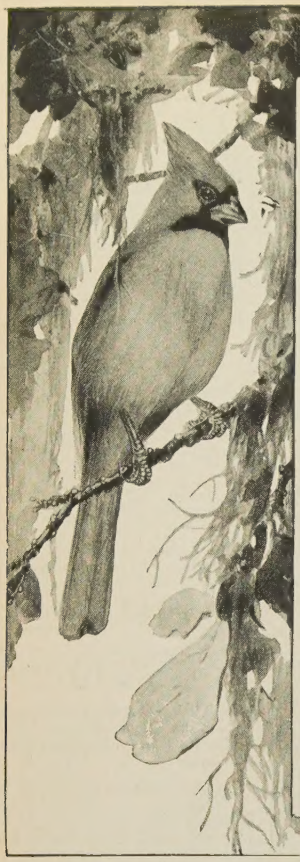

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MANY ARBOR DAYS NOW

Now comes tree planting time. This spring will see thousands of new members enrolled in the tree planting army. Tree planters will honor the memory of George Washington this year, thus marking ahead of time the bicentennial of his birth in 1932. Then next year they will plant more trees and dedicate with appropriate ceremony those planted this year. Here is a list of the approaching Arbor Days:

Arizona, in five northern counties, April 3; Arkansas, March 7; California, March 7; Colorado, April 17; Connecticut, April to May by proclamation; Delaware, April by proclamation; District of Columbia, April 17; Idaho, April 29; Illinois, proclamation in April; Indiana, April 10; Iowa, proclamation; Maryland, April 10; Massachusetts, April 25; Michigan, April 25; Minnesota, in April; Missouri, April 10; Montana, May 12; Nebraska, April 22; New Hampshire, proclamation in May; New Jersey, April 10; New Mexico, March 13; New York, last Friday in April and the first two Fridays in May for upper and lower parts of state; North Carolina, March 20; North Dakota, option of Governor; Ohio, proclamation of Governor; Oregon (Eastern), April 10; Pennsylvania, proclamation; Rhode Island, May 8; South Dakota, April; Tennessee, April 3; Utah, April 15; Vermont, option of Governor; Virginia, proclamation in spring; West Virginia, April 10; Wisconsin, May 1; Washington, May 1; Wyoming, May 1. The bicentennial class, 1932, in all schools and colleges is asked to make plans. The elms at Yale and Oberlin are famous and so would be the bicentennial class trees in years to come.

But there are many days other than the official one on which to plant. The main thing is to get ready by writing at once to the American Tree Association at Washington, D. C., for a "Bicentennial Tree Planting Book." This tells how to plant; what is best for your latitude and how to enroll your name on the association's national honor roll. You will want to be listed as having planted at least one tree in memory of George Washington. Perhaps you can interest your community in having a part in the national celebration.

Above: The Woman's Club of St. Petersburg, Fla., plant a tree for Washington on the grounds of the Club House. Mrs. C. G. Blake is the president. Mrs. K. B. Tippetts registered the tree with the American Tree Association.

On the right, Pinellas County (Fla.) Federation of Women's Clubs plant a tree for Washington during meeting at Clearwater. The dedication was by Mrs. George Merrell.

1-Juniper Virginiana, 2-Mugho Pine, 3-Colorado Blue Spruce, 4-Golden Arbor Vitae, 5-Retinospora

5 EVERGREENS $2.50

10 for $4.00
25 for $10.00

Golden Arbor Vitae

Foliage of a very showy, golden color. Used extensively in landscape plantings, for there is nothing quite so attractive in a group of Evergreens as a flash of rich golden yellow. Grows to a height of 15 feet. Specimen plants, 1½ to 2 feet (6 years old), **$2.50** each, by express or freight, not prepaid. Mailing size, 4 years old, **75c** each, postpaid.

Pyramidal Arbor Vitae

A densely columnar type, similar in shape to Irish Juniper, averaging only 24 to 30 inches in diameter when 12 feet high. Foliage deep green. Specimen trees, 3 to 4 feet, **$4.00**; 2 to 3 feet, **$2.75**; 1½ to 2 feet (6 years old), **$2.00**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

American Arbor Vitae

The most popular Arbor Vitae. Grows to a height of 30 feet. Specimen trees, 3 to 4 feet, **$2.75**; 2 to 3 feet, **$2.25**; 1½ to 2 feet, (6 years old), **$1.75**, not prepaid. Mailing size, 4 years old, **75c** each, postpaid.

Irish Juniper

Foliage bluish-green. Grows to a height of 8 feet; very dense and upright habit. Fine for columnar effect in landscape work. Specimen trees, 2 to 3 feet, **$2.50**; 1½ to 2 feet (6 years old), **$2.00**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

Juniper Virginiana

Form tapering, symmetrical. Foliage varies from light green to dark green, grayish green and bluish green, with bronzy appearance in fall and early winter. Very attractive. 3 to 4 feet, **$3.25**; 2 to 3 feet, **$2.50**; 1½ to 2 feet (5 years old), **$2.00**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

Scotch Pine

A handsome, big broad tree. Thrives well on poor soil; grows rapidly when young, and at maturity attains a height of 50 feet. 3 to 4 feet, **$3.00**; 2 to 3 feet, **$2.25**; 1½ to 2 feet (6 years old), **$1.75**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

Retinospora Plumosa

A handsome Evergreen from Japan with feathery, light green foliage, more beautiful than a fern. 2 to 3 feet, **$3.00**; 1½ to 2 feet (6 years old), **$2.50**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

Retinospora Plumosa Aurea

Same as above except color, which has a decided tinge of yellow. 2 to 3 feet, **$3.00**; 1½ to 2 feet (6 years old), **$2.50**, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

Mallow Marvels

Blue Spruce Trees 75c

The most beautiful Evergreen tree. Its silvery blue luster, perfection in form and hardy characteristics make it the most valuable of all ornamental trees. Very effective when planted individually or in groups. Choice, well-branched, specimen trees, by freight or express, not prepaid, 3 to 4 feet, **$8.00**; 2½ to 3 feet, **$6.50**; 2 to 2½ feet, **$5.50**; 1½ to 2 feet (7 years old), **$4.50**. Mailing size, 4 year old trees, **75c** each, postpaid.

Globe Arbor Vitae 75c

A compact, round ball; grows about 6 feet; bright green foliage. The neat globular outline adapts this Arbor Vitae for formal plantings, tub and window box use, as well as in the foreground of Evergreen groups. Select specimen plants, 1½ to 2 feet, (6 years old), **$2.50** each, not prepaid. Mailing size, 3 years old, **75c** each, postpaid.

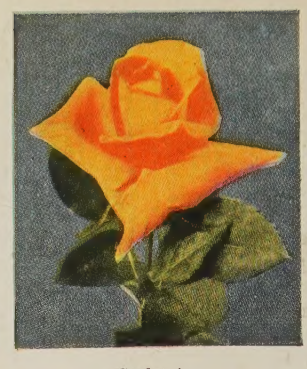
Evergreens 38c to 75c Each—

Select the varieties of Evergreens you want, in mailing size trees, at **75c each; 5 for $2.50; 10 for $4.00; 25 for $10.00; or 100 for $38.00, delivered to you, prepaid.**

We can, in addition to the varieties described in this advertisement, supply **Balsam Fir, Japanese Yew, Oriental Arbor Vitae, Siberian Arbor Vitae, American Hemlock, Austrian Pine** and **Norway Spruce.**

Our mailing-size trees are transplanted field grown stock, 3 to 4 years old, and in four or five years should be worth $4.00 to $5.00 each.

Order direct from this advertisement. Satisfaction Guaranteed.
Send your orders early and plants will be sent at the right time.



Sunburst

Radiance

Everblooming Roses 25c Each

Take your choice of the following Everblooming Roses, in 1-year-old plan at 35c each; 3 for **$1.00**; 5 for **$1.50**; 10 for **$2.50**; or 2-year-old field gro bushes at 75c each; 3 for **$2.00**; 5 for **$3.00**; 10 for **$5.00**, postpaid.

Columbia, deep peach pink.
Duchess of Wellington, soft golden yellow, veined copper and red.
Francis Scott Key, rich glowing scarlet.
Gruss an Teplitz, dazzling fiery crimson.
Los Angeles, flame pink, tinged with red and yellow.
Madame Butterfly, pink, apricot and gold.
Radiance, carmine-rose.
Red Radiance, cerise-red.
Sunburst, orange-copper and golden yellow.
White American Beauty, the best white rose.

Hardy Climbing Roses 25c

Climbing American Beauty. Large roses, rosy-crimson.
Blue Rambler
Dorothy Perkins (Pink Rambler)
Red Dorothy (Red Rambler)
Yellow Rambler

Your choice of the above varieties of Roses, in 1-year plants, at 35c each; for **$1.00**; 5 for **$1.50**; 10 for **$2.50**; or 2-year field grown plants at 75c eac 3 for **$2.00**; 5 for **$3.00**; 10 for **$5.00**, postpaid.

12 Mammoth Mallow Marvels $1.50

These are a wonderfully improved form of our greatly admired Hibiscus, which flowers of enormous size, frequently 10 to 12 inches in diameter, ha been developed. Plants 4 to 7 feet high and produce an abundance of flow in all shades of crimson, pink and white. Do well on eith dry or wet ground and hardy as an oak. Bloom continua from July until October. Our field grown plants a blooming size (will blossom this year), and are the riche and finest mixture of colors we have seen. 25c each; 3 f 50c; 12 for **$1.50**, postpaid.

"Cut and Come Again" Gladiolus

Immense spikes bearing huge blossoms of shrim pink with a throat of orange tinted with carmi Sends up new spikes after the old are cut, maki it almost everblooming; often 100 blooms from o bulb. Each 15c; 3 for 40c; 12 for **$1.50**; 25 f **$2.75**; 100 for **$10.00**, postpaid.

Globe Arbor Vitae

5 Dwarf Evergreens $2.50

The following varieties are valuable for foundation plan ings, rock gardens, and tub and window box use, as well in the foreground of Evergreen groups and in any situati where dwarf trees are desired.

Tom Thumb Arbor Vitae, a very dwarf Evergreen wi fine feathery foliage; **Juniper Pfitzeriana**, grows to height of 5 feet, vase-shaped, bluish-green foliage; **Japane Yew**, grows 3 to 4 feet, ornamental bright scarlet berri **Mugho Pine**, never grows over 5 feet and by annual shea ing it can be kept as small as desired; **Globe Arbor Vit** (described above). Your choice of above varieties, in 3 a 4 year old plants, at 75c each; 5 for **$2.50**, postpaid.

SEED AND NURSERY CATALOG FRE

We particularly solicit the patronage of discriminating pla ers—those who want something exceptionally fine. Or direct from this advertisement. Also ask us for a free co of our Seed and Nursery Book for 1931, which tells y about the best in Flower and Garden Seeds, Ornamen Shrubbery, Shade Trees, Roses, Hardy Perennials, Fr Trees, Berry Plants, House Plants, etc.

BURGESS SEED and PLANT CO.

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